COMPARISON OF OUTCOMES IN PATIENTS UNDERGOING HEMIARTHROPLASTY OF THE HIP JOINT BY POSTERIOR VERSUS LATERAL APPROACH

A THESIS SUBMITTED TO

BABA FARID UNIVERSITY OF

HEALTH SCIENCES, FARIDKOT (PUNJAB)

IN THE PARTIAL FULFILLMENT

FOR THE AWARD OF DEGREE OF

MASTER OF SURGERY

IN

ORTHOPAEDICS

2023

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ACKNOWLEDGEMENT

"“Finis coronat opus”

(“The end crowns the work”)

As I sit down to pen down the conclusion to my thesis, to begin with I would bow before the lotus feet of the Almighty, and my Gurus who are the bestower of all wisdom. Next, I would bow down before my parents, ***S. Avtar Singh*** *and* ***Mrs. Ravinder Kaur****, who did everything they could to make my life easy while battling their own share of adversities, and who always taught me to practice my profession with empathy and sincerity. Also, my uncle* ***Prof. Gurdeep Singh*** *who guided me on the path to academic excellence from an early age.*

This thesis would not have seen the light of the day without the tireless support and motivation by my supervisor and my mentor ***Dr Pankaj Mahindra*** *(Professor, Department of Orthopedics, DMC&H, Ludhiana). His teachings and guidance have kept me on track and motivated me to achieve my goals. I would like to express the deepest appreciation for my co-supervisor* ***Dr Harpal Singh Selhi*** *(Professor & Unit Head, Department of Orthopedics, DMC&H, Ludhiana) who through his constant guidance and help made this research worthwhile.*

I sincerely thank ***Dr Rajnish Garg*** *(Professor & Head, Department of Orthopedics, DMC&H, Ludhiana) for his blessings and encouragement at every stage of our residency and research.*

I would also take this opportunity to convey my regard towards ***Dr Deepak Jain, Dr Shekhar Singal, Dr Anubhav Sharma*** *who as my teachers and mentors at DMC&H, Ludhiana were a constant source of valuable guidance and encouragement.*

I owe a big thanks to my indispensable friends, especially ***Dr Maryada Rooprai, Dr Saurav Mittal, Dr Suchita Rajoria****, who stood by me in my moments of weakness and doubt.*

I would also like to thank all my seniors especially, ***Dr Aamna Athwal****,* ***Dr Udit Vyas, Dr Sahil Singla*** *and* ***Dr Tushar Singla*** *who guided me throughout this study. My batchmates* ***Dr Avi Badhan, Dr Guryodh***

Singh, Dr Sahil Sahota *and* ***Dr Tushar Jethi****; also, my juniors especially* ***Dr. Manvir Singh, Dr. Harshaan Singh Pooni, Dr. Vikramjeet Singh, Dr. Gaurav Verma****, and* ***Dr. Ramandeep Singh*** *who supported and encouraged me in this endeavour.*

A special thanks to ***Mrs Niharika*** *and her team at Research & Development Centre, DMC&H, Ludhiana for their efforts and valuable help during this study.*

Dr. Malwinder A. Singh

LIST OF ABBREVIATIONS

AAOS	American academy of orthopedic surgeons
ASA	American society of anaesthesiologists
ASIS	Anterior superior iliac spine
ATLS	Advanced trauma life support
BMD	Bone mineral density
CSE	Combined spinal epidural anaesthesia
EQ-5D	Euroqol 5d questionnaire
HA	Hemiarthroplasty
HHS	Harris hip score
HRQoL	Health related quality of life
IF	Internal fixation
MCFA	Medial circumflex femoral artery
PBH	Pelvis with both hips
PROM	Patient reported outcome measure
ROM	Range of motion
RTA	Road traffic accident
SA	Spinal anaesthesia
TFL	Tensor fascia lata
THA	Total hip arthroplasty

ABSTRACT

Background: Hip Hemiarthroplasty has been shown to be an effective treatment for displaced femoral neck fractures in the elderly and the medically infirm. There is a scarcity of data comparing the lateral and posterior approaches for Hemiarthroplasty, necessitating a dedicated study, to statistically establish the difference between both approaches.

Objectives: To evaluate the functional outcome in the immediate post-operative period as well as at 4 weeks, 8 weeks, 3 months and 6 months in patients undergoing Hemiarthroplasty using the posterior and lateral approaches and to statistically establish the difference in the mean outcome between the two approaches, if any.

Methods: Total 83 patients undergoing Hemiarthroplasty of the hip joint in Dayanand Medical College &Hospital, Ludhiana from 1st January 2021 through 31st March 2022 were evaluated for peri-operative blood loss, operating time, length of hospital stay, as well as evaluated using the HHS in the immediate post-operative period, and then at 4 weeks, 8 weeks, 3 months & 6 months, and for incidence of complications, to compare the outcome in patients operated using the posterior and lateral approaches.

Results: 83 patients were analysed at final followup, and majority of the study population was elderly with 90.36% of the patients aged 60 years or above. The study population was almost equally divided between 43 female patients (51.80%), and 40 male patients (48.19%). 32 patients were operated using the lateral approach and 52 patients with the posterior approach. Posterior approach was fared marginally better in terms of intra-operative blood loss, operating time, start of weight bearing, HHS, and functional outcome at the final followup. Lateral approach was found to be slightly in terms of duration of hospital stay. The difference between both the approaches was not statistically significant for any of the above parameters.

Conclusion: Our study found no statistically significant difference between the lateral or posterior approaches for Hemiarthroplasty based on the functional outcomes or incidence of complications, with neither of the approached providing a clear advantage over the other. As a result, it is recommended that the choice of the surgical approach should rather be based on expert opinion based on surgeon preference and experience.

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KEY TO THE MASTER CHART

ASA - AMERICAN SOCIETY OF ANAESTHESIOLOGISTS

CAD – CORONARY ARTERY DISEASE

CKD – CHRONIC KIDNEY DISEASE

CLD – CHRONIC LIVER DISEASE

CSE – COMBINED SPINAL EPIDURAL ANAESTHESIA

DM II – DIABETES MELLITUS TYPE 2

HHS – HARRIS HIP SCORE

HTN - HYPERTENSION

ILD – INTERSTITIAL LUNG DISEASE

RTA – ROAD TRAFFIC ACCIDENT

SA – SPINAL ANAESTHESIA

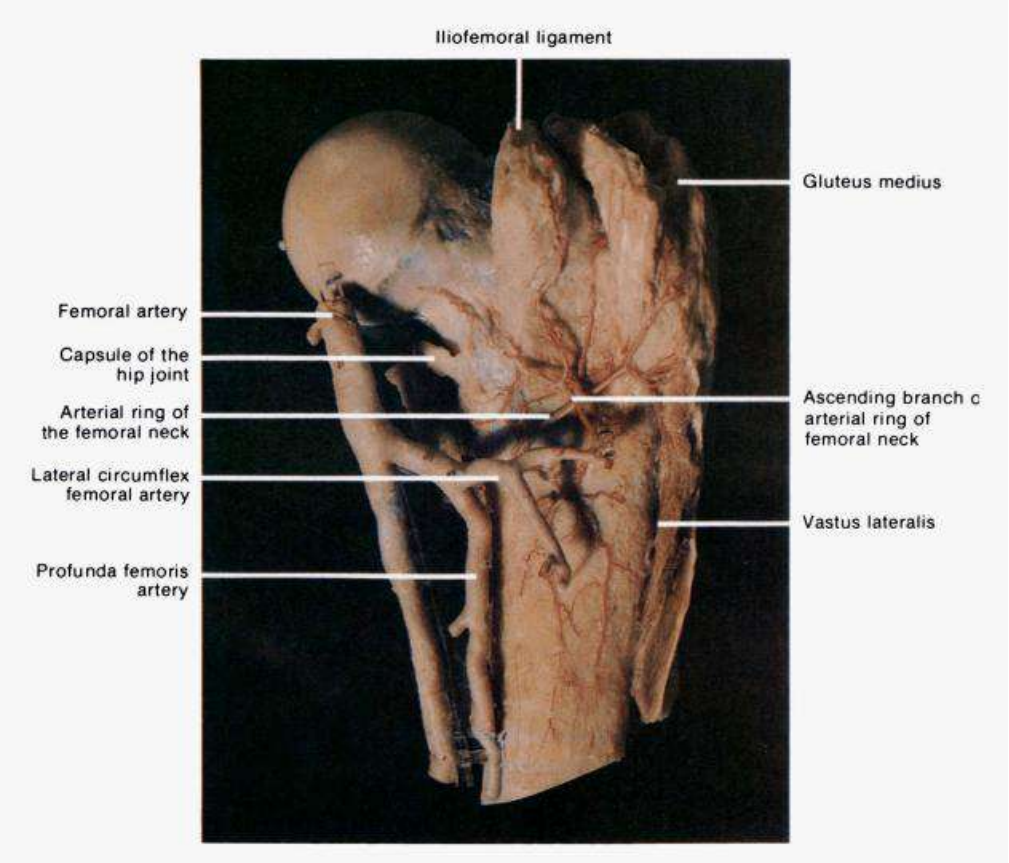
INTRODUCTION

Anatomy of the hip joint

The hip joint is a ball-and-socket (multiaxial spheroidal) synovial joint that connects the head of the femur to the cup-shaped (cotyloid) acetabulum. The hip joint connects the lower limb to the pelvic girdle, and it is designed for both stability and for allowing a wide range of motion.

To accommodate the full range of motion, the femoral head is covered with articular cartilage beyond the reaches of the acetabular brim. The covered region accounts for 60 to 70% of a sphere. The femoral neck, which varies in length depending on body size, connects the femoral head to the femoral shaft. The normal adult has a neck-shaft angle of 125±5°. The significance of this feature is that the femoral shaft is laterally displaced from the pelvis, allowing for greater freedom for joint motion.

The vascular supply to the femoral head has been extensively studied due to the risk of avascular necrosis of the head when it is disrupted, particularly in femoral neck fractures or hip dislocation. Three sources for this blood supply are noted: a small vessel found within the ligamentum teres (present in about 80% of the population) which descends from the posterior branch of the obturator artery and attaches at the fovea, a supply from the medullary canal and an anastamosis of vessels creeping around the femoral neck. From this latter supply, the vessels ascend toward the femoral head in the synovial lining and are reflected onto the femoral head. These vessels arise from the medial circumflex femoral artery, which branches off the deep femoral artery, the MCFA contributing about 82% to vascularity of the femoral head. [1] The contribution of lateral circumflex artery is comparatively much less significant. [3] This leaves the femoral head vulnerable to avascular necrosis in the presence of a femoral neck fracture since these vessels are easily ruptured with this injury.



Picture 1: The anterior aspect of the upper end of the Femur of a 50-year-old man showing the blood vessels around the Head and Neck of Femur. Arteries injected with red latex rubber. [3]

It is very pertinent to be well-conversant with the muscular anatomy of the hip joint. The muscles that act on the hip joint not only contribute to stability but also provide the forces needed for hip movement. These muscles are classified into three groups: inner hip muscles, outer hip muscles, and adductor muscles. The fascia lata is a fibrous layer that covers the musculature of the hip and thigh. This is a continuous fibrous sheath that wraps around the thigh. Its inelasticity serves to limit thigh muscle bulging, improving the efficiency of their contractions.

The most powerful hip flexor is the iliopsoas, but it is assisted by the sartorius, rectus femoris, and tensor fascia latae (TFL). Sartorius runs from the ASIS to the tibial tuberosity and is innervated by the femoral nerve. It also helps with abduction and external rotation. The gluteus maximus is the hip's largest and most powerful extensor. Running from the lateral aspect of the dorsal sacral surface, posterior part of the ilium and thoracolumbar fascia it inserts into the iliotibial tract and gluteal tuberosity on the femur. It is also involved in external rotation of the hip. Its upper and lower fibres contribute to abduction and adduction respectively.

Gluteus medius has a wide origin on the surface of the iliac bone between the anterior and the posterior gluteal lines and inserts on the greater. Gluteus minimus, which is covered by the former, also arises from the iliac bone below the anterior gluteal line and inserts on the anterior facet of the greater trochanter and partially in the joint capsule. The gluteus medius, gluteus minimus, and tensor fascia lata work together to stabilise the pelvis and abduct and internally rotate the hip. Gluteus maximus also helps to stabilise the pelvis, abducts the hip, and is an external rotator and extensor of the hip. [4]

The short external rotators are located posteriorly, inferior to the piriformis, and run horizontally. These are the superior gemelli, obturator internus, inferior gemelli, and quadratus femoris, in that order. All contribute to hip external rotation and adduction.

Biomechanics of the hip joint

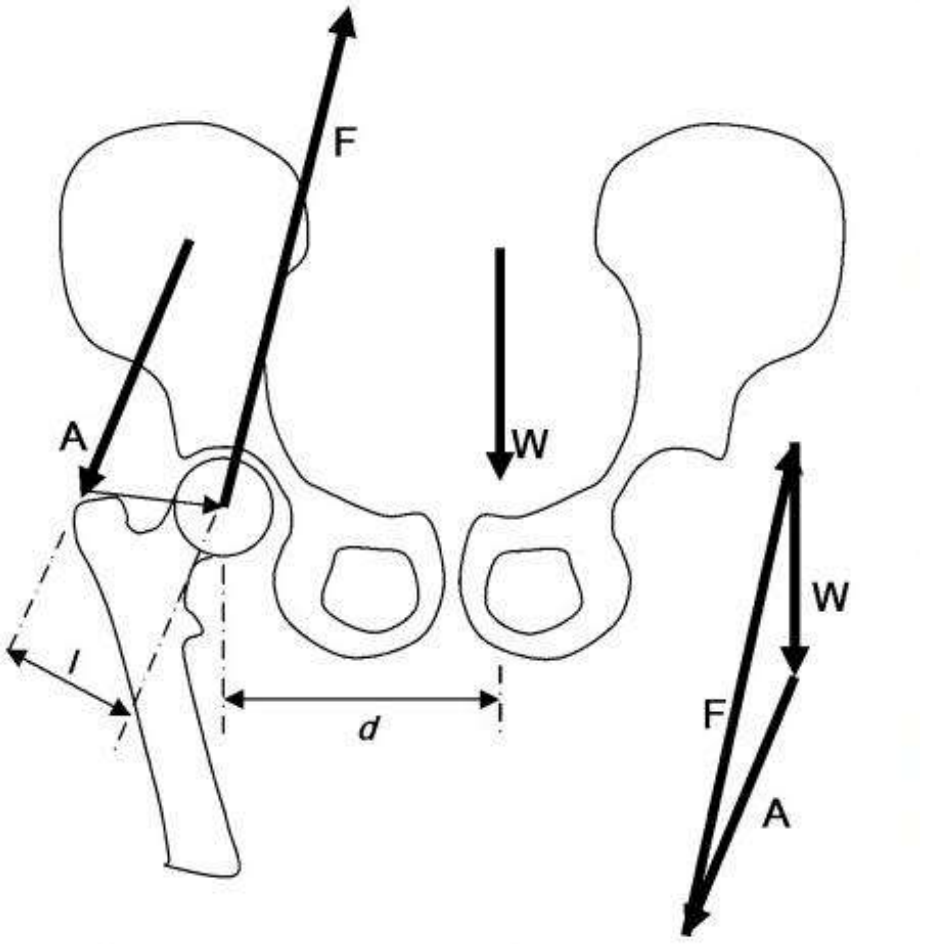
The transition from quadrupedal to bipedal gait was a significant biomechanical milestone in the evolution of Homo sapiens as a species. The biomechanical features of the human lower limb, which are primarily responsible for stance and bipedal propulsion, differ significantly from those of the quadruped lower limb, and these differences are reflected in the anatomy and biomechanics of the human hip, knee, ankle, and foot joints. [5]

Although the hip joint is one the most flexible joints in the body, second only to probably the glenohumeral joint, some range of motion has been sacrificed in order to achieve greater stability. [6] As a result of this stability, a young and healthy patient's hip joint should not fracture in the absence of high energy trauma. Indeed, neck of femur fracture in the youngare traditionally seen mostly in high-impact road traffic accidents. [7]

The prosthetic implant used for hemiarthroplasty must be able to withstand years of cyclic loading. During normal walking, static forces around the hip range from 3.5 to 5 times body weight, and these forces are amplified during acceleration and deceleration. [8] During the stance phase, forces are approximately 5-6 times the body weight. Slow walking reduces forces, which are at their least during the swing phase of the gait. Forces generated during active straight leg rising and non-weight bearing walking are twice the body weight.

The forces acting about the hip joint may be described as:

Effort × Effort arm = Load × Load arm, i.e. Abductor pull × Abductor lever arm = Body weight × Load arm. [9]



Picture 2: Forces acting on the hip joint during single leg stance. (Gravitational force W, abductor muscle force A, hip joint reaction force F, abductor muscle moment arm l, and force of gravity moment arm d) [10]

To keep the pelvis level during one-legged stance, the abductor musculature must exert an equal moment via a lever arm extending from the lateral aspect of the greater trochanter to the centre of the femoral head. The normal body lever arm to abductor lever arm ratio is 2.5:1. This means that the abductor musculature must work 2.5 times the body weight to keep the pelvis level while standing. The load may be 10 times the body weight when lifting weights, running, jogging, or jumping. As a result, a patient with an artificial hip joint should avoid

these activities as excess body weight or physical activity has the potential to loosen or break the stem. These forces are not only in the coronal plane, but also in the sagittal plane. The centre of gravity is in the midline, anterior to the S2 vertebra, and posterior to the axis of the hip joint. When the hip is loaded in flexion, as when rising from a chair or ascending or descending stairs, these forces are increased. The resultant force applied at a point even further anterior on the head during this act will result in posterior deflection or retroversion of the femoral implant.

Femur neck fractures

Femoral neck fractures are more common in women and occur most commonly in the elderly after a seemingly minor fall or twisting injury. [11] Numerous factors, including osteoporosis, malnutrition, decreased physical activity, impaired vision, neurologic disease, poor balance, altered reflexes, and muscle atrophy, are linked to the high incidence of hip fractures in the elderly population. Despite appropriate medical and surgical management, chronically ill elderly patients are at an increased risk of infection and other systemic complications after fracture. Osteoporosis is still the leading cause of hip fractures, and its prevalence has been well documented in age-, race-, and gender-matched controls. [12,13]

Despite appropriate medical and surgical management, chronically ill elderly patients are at an increased risk of infection and other systemic complications after fracture. Osteoporosis is still the leading cause of hip fractures, and its prevalence has been well documented in age-, race-, and gender-matched controls. Femoral neck fractures can occur in young patients, but they are less common. These fractures are usually the result of high-energy trauma and are frequently associated with other injuries. [14]

A femoral neck fracture may cut off the epiphyseal branches as they run along the Weitbrecht's retinaculum, particularly during femoral head displacement. Severance of upper retinacular vessels may be

seen even with capital displacements less than ½ the head's greater diameter in length. [15] Angiographic studies have shown interrupted circumflex arteries or retinacular vessels in displaced fractures of the femoral neck. [16,17]

A so-called tamponade effect is another mechanism implicated in the development of femoral head necrosis. This is due to an increase in intracapsular pressure caused by blood effusion if the joint capsule remains intact, which can happen, even in the presence of significant fragment displacement. [18] This pressure increase of up to 150 mm Hg in hip abduction and internal rotation may obstruct venous drainage and retinacular artery. Based on studies, the possibility of impaired venous drainage underlying necrosis has been reported. [19,20]

Epidemiology

Hip fractures are a common source of morbidity around the world, especially among the older age group. Globally, an estimated 1.6 million hip fractures occurred in the year 2000, accounting for approximately 20% of all fractures in people aged 50 and older, (21) and the number is estimated to rise to about 6.26 million per year by the year 2050. [22] The epidemiological data varies by country, but hip fractures are expected to affect approximately 18% of women and 6% of men worldwide. Although age-standardised incidence is gradually declining in many countries, this is far outweighed by population ageing. [23]

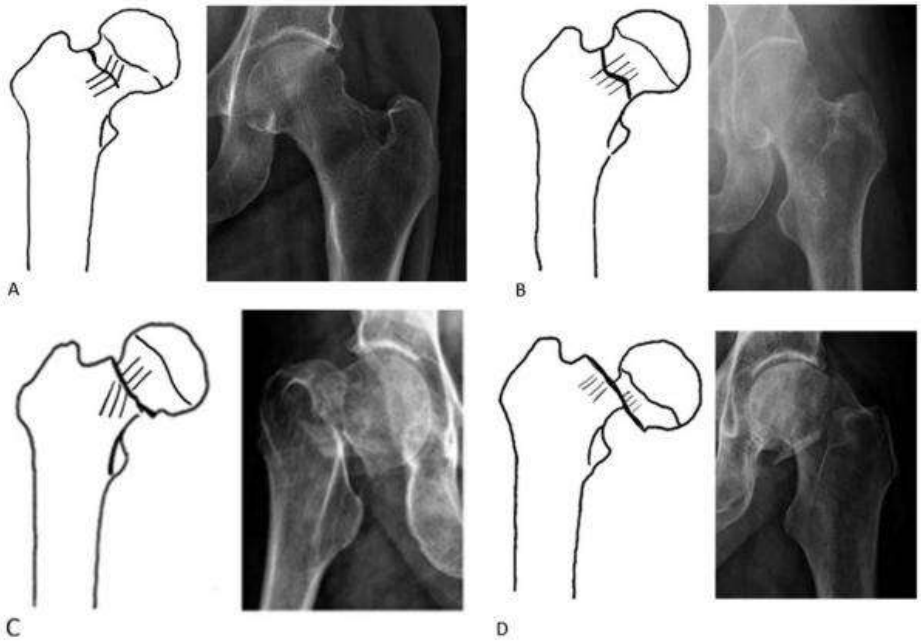
In the elderly, femoral neck fractures are associated with low energy falls, [24] mostly owing to decreased bone density in the older age group, especially elderly females. [25] In younger patients, the cause of a femoral neck fracture is usually secondary to high-energy trauma, such as a fall from a considerable height or a road traffic accident.

Classification system

As early as 1823, Sir Astley Paston Cooper, a leading surgeon of London described the fractures of neck of Femur in his work 'A Treatise on Dislocations and on Fractures of the Joints: Fractures of the Neck of the Thigh-bone', and divided the fractures into intracapsular and extracapsular fractures, a characteristic of the fracture he felt had a bearing on the final union and limb length discrepancy in the patient. [26] Later in 1935, Freidrich Pauwels, a German orthopaedician devised a classification system [27] in which he classified the fractures based on the angle of inclination of the fracture line with respect to the horizontal as: Degree I, up to 30 degrees; Degree II, between 30 and 50 degrees; and Degree III, 50 degrees and more. As the angle of inclination increases, there is an increase in vertical shearing forces which increases the likelihood of displacement, postreduction nonunion, and fixation failure. [28]

In 1961, a British surgeon R.S. Garden published a classification system aimed at guiding the therapeutic management of Femur neck fractures, [29] in an attempt to distinguish fractures in which stability can be achieved versus those which are difficult to stabilise. [30] The Garden classification takes into account femoral head and neck displacement, fracture completeness, and the relationship of bony trabeculae. Gardens initially examined 80 patients with femoral neck fractures, categorising them as Types I through IV based on AP radiographs of the hip. At the conclusion of a 12 months period of follow-up he observed that Types I and II fractures showed 100% union. Types III and IV union rates were 93% and 57%, respectively. Clinicians have simplified the Garden classification over time by classifying femoral neck fractures as either no displaced or displaced, as displacement is what typically guides treatment options. [31]

Type	Description
Type 1	Incomplete nondisplaced fractures, including valgus impacted fractures
Type 2	Complete, nondisplaced fractures
Type 3	Complete, incompletely displaced fractures
Type 4	Complete, completely displaced fractures



Picture 3: The Garden classification is depicted in the drawings and radiographs for Garden Types [32]

Despite its drawbacks, and conflicting suggestions [33,34] regarding a proposed simplification of the classification system, Garden classification has been to have good intra-observer reliability and reproducibility, [35,36] and satisfactory inter-observer reliability. [37] In the present study we have used the Garden classification system.

Fracture complications

After a hip fracture, there is a well-established increased risk of mortality. It has been demonstrated that older people have a 5- to 8-fold increased risk of death during the first three months following a hip fracture. [38] In addition to this, a number of post-operative complications are also described, ranging from infection, delirium, [39] cardiovascular events [40]

Vestergaard et al conducted a study on a cohort of 169,145 patients with a hip fracture and 524,010 controls for up to 20 years after the hip fracture, and found an excess mortality among patients compared to controls. The major causes of the excess mortality were found to be due to complications to the fracture event. [41]

In the present study we have followed up patients for the incidence of complications and discussed their correlation with the functional outcome.

AIMS & OBJECTIVES

AIMS

To evaluate the functional outcome in the immediate post-operative period as well as at 4 weeks, 8 weeks, 3 months and 6 months in the patients undergoing Hemiarthroplasty using the posterior and lateral approaches and to statistically establish the difference in the mean outcome between the two approaches, if any.

OBJECTIVES

To evaluate patients operated using the posterior and lateral approaches in the immediate post-operative period on the basis of peri-operative blood loss, length of hospital stay, as well as evaluated using the Harris Hip Score (HHS) in the immediate post-operative period, and then at 4 weeks, 8 weeks, 3 months & 6 months respectively, and incidence of complications.

REVIEW OF LITERATURE

Most femoral neck fractures are treated surgically to allow for early patient mobilisation, reduce the risk of complications, and improve patient outcomes. Nonsurgical management should be considered only in patients who are critically ill and pose a high surgical risk. [34] Various operative options are available, including in situ fixation, closed or open reduction and internal fixation, hemiarthroplasty, and total hip arthroplasty. In younger patients, there is a general consensus in favour of internal fixation. Arthroplasties are recommended as the treatment of choice for elderly people who are institutionalised and have limited baseline physical activity.

Arthroplasty versus internal fixation

According to the clinical practice guidelines adopted by The American Academy of Orthopaedic Surgeons (AAOS) in 2021 with regard to management of hip fractures in the elderly, arthroplasty was recommended over internal fixation, also they didn't favour any particular surgical approach in patients who were treated with hemiarthroplasty. [42]

In their meta-analysis, Zhenyu Dai et al found that in comparison to internal fixation, arthroplasty not only reduced surgical revision in elderly patients with Femur neck fractures but also the incidence of complications and does not increase mortality. [43] In addition, patients treated with hemiarthroplasty have better functional outcomes and a higher post-operative satisfaction rate as compared with those treated with internal fixation, as observed by Gjertsen et al in their study conducted on 4334 patients followed up for twelve months post-operatively. [44]

Extensive studies including those by Richards et al have observed that hemiarthroplasty may reduce the relative risk of reoperation in elderly patients by as much as 70% when compared to internal fixation, even with nondisplaced and minimally displaced femoral neck fractures. [45]

Lu et al conducted a randomized comparative study on patients aged above 80 years, who had sustained fracture neck of Femur and were treated with either hemiarthroplasty or internal fixation. They concluded that incidence of complications directly related to surgery in HA group was significantly less than that in IF group. Also, total incidence of complications of internal fixation group (43.90%) was significantly higher than that of Hemiarthroplasty group (24.32%) (p value = 0.000). In addition, patients treated with Hemiarthroplasty had significantly lower need for re-operation (p value = 0.000) and had better hip function outcomes (p value <0.05). [46]

Frihagen et al conducted a randomised trial on 222 patients of mean age 83 years treated with two parallel screws or with a bipolar cemented hemiarthroplasty with regard to functional outcome and quality of life in the treatment of displaced intracapsular fractures of the femoral neck. The incidence of complications was significantly lower in patients treated with hemiarthroplasty than those with internal fixation (p value <0.001), also the hemiarthroplasty group scored better on Harris hip score (p value = 0.01), Eq-5d (p value = 0.01) and Barthel index (p value = 0.02) [47]

Parker et al conducted a prospective randomised trial in which 455 patients with a displaced intra-capsular fracture of neck of Femur with a mean age of 82 years were randomised to either closed reduction or internal fixation with three cancellous screws or replacement with an uncemented hemiarthroplasty. Arthroplasty had a significantly lower re-operation rate compared with internal fixation (p value < 0.001), amounting to 7.3 times increased risk of revision surgery for the screw fixation group. [48]

Hemiarthroplasty versus Total Hip Arthroplasty

The current body of evidence shows that individuals who undergo a total hip arthroplasty have a minor functional outcome benefit over those treated with hemiarthroplasty. Conversely, Hemi arthroplasty is linked to a slight reduction in the incidence instability, dislocation and

other complications. Risk and benefit must be discussed with patients and their families in order to select the best course of treatment. This could help determine which patients would benefit the most from functional improvement or avoiding complications, such as those whose preoperative function does not justify a surgical procedure with higher risks.

Chammout et al conducted a randomized single-blinded trial on 120 patients with a mean age of 86 years who had sustained a displaced femoral neck fracture. The patients were randomized to treatment with hemiarthroplasty or total hip arthroplasty. They concluded that up to 2 years after surgery, there was no difference in outcomes between hemiarthroplasty and total hip arthroplasty in the patients. Based on their study they also recommended that in the short term, hemiarthroplasty is an appropriate procedure for this group of patients. [49]

van den Bekerom et al conducted a randomised controlled multicentre trial on 252 patients above 70 years of age with fracture neck of Femur who were randomised to receive either a hemiarthroplasty or a total hip arthroplasty. It was observed that at one- and five-year follow-up no differences were observed in the modified Harris hip score (mHHS), revision rates, local & general complications or mortality. They concluded that because of a higher intra-operative blood loss (p value < 0.001), an increased duration of the procedure (p value < 0.001) and a higher number of dislocations (p value = 0.002), THA should not be recommended as the treatment of choice in such patients. [50]

Sharma et al followed up a group of 80 patients aged 60 years and above with displaced femur neck fracture randomised to get treated with either hemiarthroplasty or THA, for a period of 4 years. It was observed that among the patients included in the study, hemiarthroplasty required less operative time, incurred less blood loss per operatively, and had fewer postoperative complications than THA.

Conversely, THA showed a better functional outcome at one year than hemiarthroplasty (p value <0.05). [51]

Li et al conducted a systemic review and meta-analysis including 19 studies with a total of 413,140 patients in the Hemiarthroplasty group and 44973 in the THA group. It was observed that blood loss, surgery time, and incidence of dislocation were all markedly decreased in the Hemiarthroplasty group. There was no significant difference in terms of overall incidence of complications, mortality, reoperation and infections between the two groups. [52]

Evolution of Hemiarthroplasty

Hemiarthroplasty as a procedure as well as the materials used for the implant itself have undergone a long period of evolution.

Delbet in France used reinforced rubber prosthesis to replace the femoral head in 1919. Heygroves of England used an ivory prosthesis in 1927.

In 1939, Dr. Charles Scott Venable, an American surgeon collaborated with Dr. Harold Bohlman to create a Vitallium implant, an alloy he himself named, that replaced the femoral head rather than covering it, similar to today's hemiarthroplasty (it attached the vitallium femoral head to a small intramedullary nail). Dr. Venable was in fact the first surgeon to perform a hip fracture hemiarthroplasty.

Around the same time in the 1940s, Dr. Austin Moore (a surgeon at a Maryland psychiatric hospital) collaborated with Dr. Bohlman to improve the hemiarthroplasty design, and introduced the process of attaching the femoral head to a stem that fit the proximal femur medullary canal. Simultaneously, Judet Bros (Paris, France) developed a heat-cured acrylic femoral head for a similar hemiarthroplasty design, which experienced high rates of early failure due to rapid wear and severe tissue reaction (considered the first cases of osteolysis). [9]

In 1950, Frederick Röeck Thompson created a cemented vitallium prosthesis with a distinctive flared collar below the head and a vertical intramedullary stem. In some countries, the Thompson and Austin Moore prostheses are still widely used to treat femoral neck fractures. [53]

Today's available Hemiarthroplasty implants include cemented and uncemented (press-fit) stems, unipolar and bipolar heads, and fixed-neck and modular-neck designs. Cemented femoral stems continue to be the gold standard of care, with excellent long-term outcomes. Recognizing intraoperative sudden death due to cardiopulmonary compromise during cementing as a serious complication has resulted in cementing techniques being modified, resulting in a threefold decrease in intraoperative mortality rates. [54] Uncemented (press-fit) stems, on the other hand, eliminate the need for cement and the risk of cement-related cardiopulmonary complications.

However, there is evidence that uncemented stems have an increased risk of intraoperative and postoperative periprosthetic fracture; additionally, some studies report increased pain and poorer functional outcomes when using uncemented stems for the treatment of femoral neck fractures in the elderly compared to cemented stems. [55,56]

Surgical approaches

Femur neck fracture patients are typically elderly, with an average age of around 80 years. The vast majority are women. Prior to the fracture, such elderly patients invariably have impaired mobility and are frequently cognitively impaired. The goal of surgery is to allow the patient to sit up and get out of bed as soon as possible.

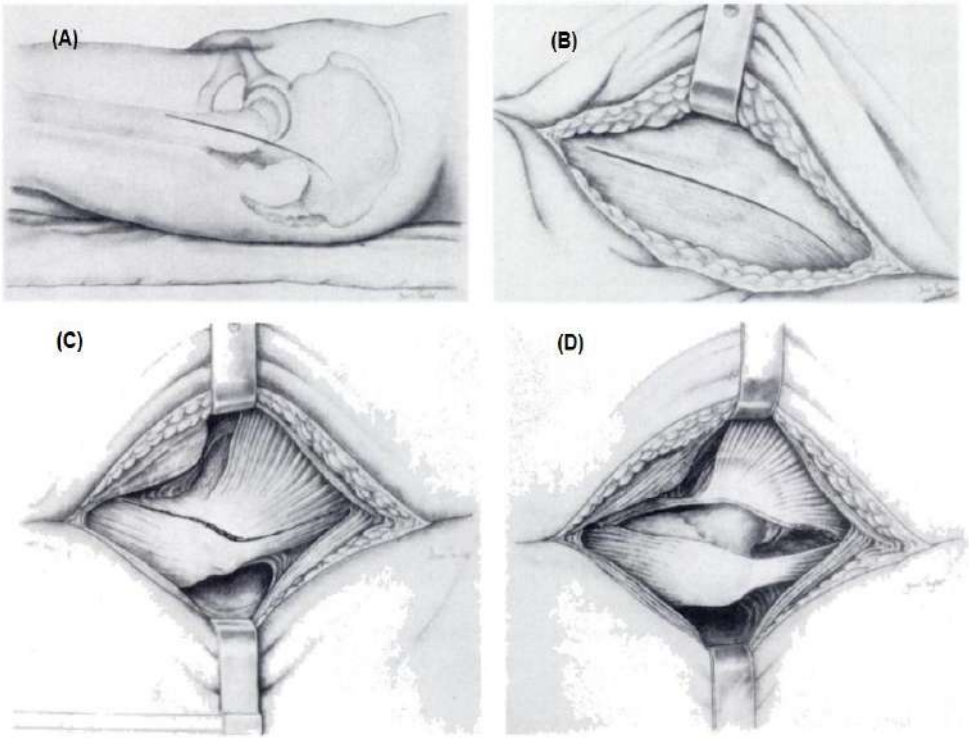
Hemiarthroplasty requires different considerations than total hip arthroplasty. In the latter, clear exposure of both the femur and the acetabulum is required, necessitating a relatively extensive exposure. Because patients are generally older and more vulnerable to anaesthetics and surgical procedures, hemiarthroplasty requires a

quick but effective operation with the least amount of trauma and physiological upset. [57]

The direct lateral approach (or Hardinge or transgluteal approach) was first described in 1982 by Kevin Hardinge [58] by modifying the earlier prevalent McFarland and Osborne approach,in which he approached the hip joint by incising the tendon of gluteus medius obliquely across the greater trochanter leaving the posterior half still attached to the trochanter. He observed that the post-operative abductor weakness was less and the rehabilitation of patients was faster. [59] This approach allows excellent exposure of the hip joint.

The direct lateral approach releases the anterior third of gluteus medius and minimus, while preserving the posterior femoral attachment of the major part of these muscles. The proximal part of the incision is limited by the superior gluteal nerve and vessels, crossing 3-5 cm proximal to the tip of the greater trochanter. Distally, the anterior fibers of vastus lateralis are elevated from the anterior femur. The anterior attachment of the hip capsule is next released from the anterior base of the femoral neck, and an anterior longitudinal capsulotomy is opened as necessary with a proximal transverse T-shaped incision. [60]

It avoids the need for trochanteric osteotomy. Because the bulk of the gluteus medius muscle is preserved intact, it permits early mobilization of the patient following surgery.



Picture 4: The lateral approach for Hemiarthroplasty

(A) Skin incision parallel to the femur distally, curving posteriorly with the greater trochanter at its midpoint.

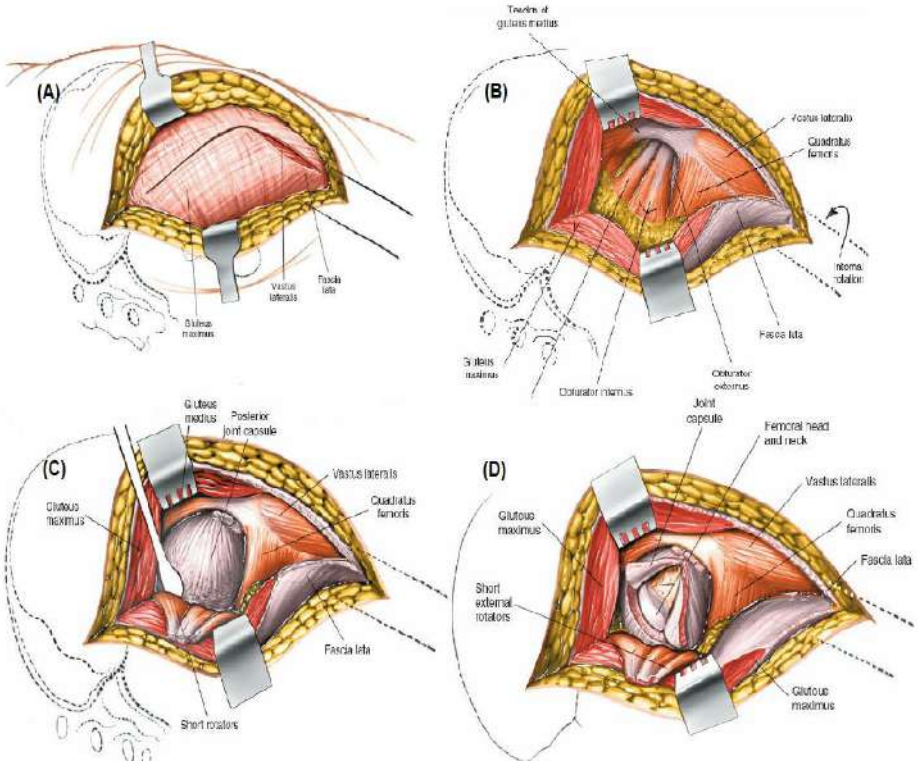
(B) Incision of the fascia latae parallel to the incision of the skin.

(C) Incision of the gluteus medius tendon leaves a cuff of tendon attached to the greater trochanter, allowing for early closure and function.

The posterior approach is the most common and practical of those used to expose the hip joint. The posterior approach has many variations, the main difference being the location of the skin incision and the level of gluteus maximus splitting. Moore's 1957 [61] description, which he advocated against the more technically demanding approach described earlier by Brackett, is the most widely used posterior approach; it is often called the Southern approach. In this the Gluteus maximus fibres by blunt dissection and cut the short external rotators to expose the capsule. The Gluteus medius is notdisturbed by this approach. [62]

The Gluteus maximus fibres are separated bluntly in line with the skin incision. This preserves superior gluteal vessel and nerve branches in the proximal half of the muscle and inferior gluteal vessel and nerve branches in the distal half of the muscle. After that, the sciatic nerve is identified and protected. The short external rotators are dissected bluntly and separated near their femoral insertion. To protect the sciatic nerve, the muscles are retracted medially, exposing the capsule.

All posterior approaches provide easy, safe, and quick access to the joint and can be completed with just one assistant. They prevent abductor power loss in the immediate postoperative period as they do not interfere with the hip's abductor mechanism. [63]



Picture 5: The posterior approach for Hemiarthroplasty

(A) Skin and fascia lata incised for the posterior approach to the hip joint

(B) Fat pushed posteromedially to expose the insertions of the short rotators. Sciatic nerve lies within the substance of the fatty tissue.

(C) Short rotators detached close to their femoral insertion and reflected backwards, laying them over the sciatic nerve to protect it.

Prasad et al performed a prospective comparative study comprising of series of 80 patients with intra-capsular neck femur fractures between 50 to 80 years of age treated with hemiarthroplasty either by posterior approach or lateral approach from October 2014 to October 2016. Patients were divided into two equal groups, group A and B operated with posterior and lateral approach respectively. Several variables including age, sex, operative time, blood loss, early surgical and post-operative complications, post-operative care, hip function and final outcome measures were noted and compared between two groups. In this study, the average Harris Hip Score at 1 year follow up was 85.62 in posterior surgical approach and 83.40 in lateral approach. Patients in both groups had good average Harris Hip Score and the difference was statically insignificant. However the posterior approach was observed to be carrying an increased risk of prosthetic dislocation as compared to the lateral approach. The rate of secondary procedures was also higher with posterior approach (12.5%) as compared to the lateral approach (7.5%). The authors concluded that there were no notable differences in outcomes and complications between the two approaches. Neither lateral nor the posterior approaches seem to offer a clear advantage regarding the early surgical complications, and a decision in favour of one surgical approach cannot be based on evidence on early surgical complication rates alone. [64]

Biber et al did a retrospective cohort study on 704 patients undergoing hemiarthroplasty out of which 487 patients were operated with posterior approach and lateral approach was used in 217 patients. Although there was no significant difference between the two approaches in terms of the overall incidence of early surgical complications (p value = 0.75), the predominant complication after the posterior approach was dislocation, the incidence of which was significantly lower in patients operated with the lateral approach. [65]

Petis et al performed a meta-analysis using the available online literature including comparative studies published from 2000 to 2014 mentioning the direct anterior, direct lateral and posterior approaches

and concluded that the anterior, lateral and posterior approaches each have unique advantages and disadvantages. High-quality clinical comparisons among the approaches are lacking in the literature; therefore they concluded that surgeon preference is likely more a function of training and anecdotal success. [66]

Leonardsson et al performed a prospective observational study on 2118 subjects having undergone hemiarthroplasty in 2009, with a mean age of 85 years. They observed that patients who had undergone surgery through a posterior approach reported a higher health-related quality of life (HRQoL, EQ-5D mean 0.52 versus 0.47, p = 0.009), less pain (visual analogue scale mean 17 versus 19, p = 0.02) and greater satisfaction with the result of surgery (visual analogue scale mean 22 versus 24, p = 0.02) than those who had a direct lateral approach. However, after adjusting for age, gender, cognitive impairment and American Society of Anesthesiologists grade, no association was found between surgical approach and HRQoL, residual pain or patient satisfaction. [67]

Rogmark et al performed Cox regression analyses on 33,205 cases of hip fractures in individuals > 60 years of age treated with modular hemiarthroplasty. Analyses based on reoperations were performed (covariates: age group, sex, type of stem and implant head, surgical approach, and hospital volume). It was found that posterior approach increased the risk of reoperation due to dislocation and periprosthetic fracture, but reduced the risk of erosion/other complications as compared to the lateral approach. [68]

In a similar study, Kristensen et al studied 20,908 cases of hemiarthroplasties due to femoral neck fracture in patients aged 60 years and older from the Norwegian Hip Fracture Register, using either the direct lateral (n= 18,918) or the posterior (n= 1,990) approach. PROM data (satisfaction, pain, quality of life (EQ-5D), and walking ability) were reported 4, 12, and 36 months postoperatively. The Cox regression model was used to calculate relative risk (RR) of

reoperation. The study concluded that patients operated with hemiarthroplasty using the posterior approach had less pain, were more satisfied, and had a better quality of life than those operated with direct lateral approach. In addition, a larger group of those operated with the posterior approach had fewer walking problems postoperatively. [69]

Hongisto et al conducted a study on a total of 393 fragility femoral neck fracture patients aged 65 years or more who underwent hemiarthroplasty by the lateral and posterior approach. Patient information was collected on admission, during hospitalization, and by telephone interview 1 year after the hip fracture. A total of 269 patients were included in the final analysis. They concluded that survival, mobility level, pain in the operated hip, and living arrangements were not significantly different between groups one year after surgery. They observed that using a lateral approach increased the likelihood of needing ambulatory aids one year after hip fracture (22% versus 12%, $p = 0.026$). The posterior approach, on the other hand, was found to be more prone to hip dislocation. [70]

Parker et al conducted a study on 216 patients with an intracapsular hip fracture being treated with a cemented hemiarthroplasty who were randomised to surgery using either a lateral or posterior approach. The conclusion of this study was that there were no notable differences in outcomes with respect to pain and mobility between the two procedures. The authors however remarked that the study size was too small to determine differences in the surgical complications. [71]

De Vries et al conducted an extensive retrospective study in two high-volume teaching hospitals in the Netherlands to compare the outcomes of the posterior and the lateral approaches in patients with a displaced femoral neck fracture treated by hemiarthroplasty. The study concluded there were no differences in the rates of post-operative infection or periprosthetic fracture. In the posterior approach, there was a trend

toward more dislocations, but this difference did not reach statistical significance (p value = 0.11). This study confirmed the relatively high incidence of post-operative complications associated with uncemented prostheses (p value for infection = 0.19, p value for periprosthetic fractures = 0.002). [72]

Scoring system

Various scoring systems including Barthel Index, Harris Hip Score, Oxford Hip Score, Charnley Hip Score, Matta Functional Hip Score,Short Form-36, Short Form-12, Nottingham Health Profile, EuroQol, Musculoskeletal Function Assessment, Short Musculoskeletal Function Assessment, Modified Hip Rating Questionnaire, and Western Ontario and McMaster Universities Arthritis Index have been used to evaluate functional outcomes in patients after hemiarthroplasty and other major hip surgeries. [73]

Harris Hip Score was proposed by an American orthopedician William H. Harris, first published in 1969, [74] to evaluate the outcomes of hip surgery or hip replacement. The standard evaluation is applicable to various hip disabilities and treatment methods in adults. [75,76]

The standard Harris Hip Score is a validated tool for measuring an individual's functional status and has traditionally been used to assess the condition of a patient with hip pathologies. The HHS is composed of 10 questions, 2 questions (ROM and absence of deformity) for the physician physical examination component and 8 questions for the patient-reported outcome component.

In the present study we have used the Harris Hip Score as a standard to periodically assess functional outcome in patients, noted during followup and finally at the conclusion of 6 months of followup, and categorisation of the final value observed at the end of 6 months as: Excellent (>90 points), Good (80-89 points), Fair/Reasonable (70-79 points) and Poor (<70 points)

MATERIALS AND METHODS

It was a prospective study, conducted on patients admitted in the department of Orthopaedics, Dayanand Medical College & Hospital, and Ludhiana during the time period from 1st January 2021 through 31st March 2022 who underwent Hemiarthroplasty. Collection of data was as per the standard performa with informed consent obtained from patients.

The variables studied were age of the patients, sex, employment status, mode of injury, ASA grade, Garden type of the fracture, time lag between the injury and the surgery, surgical approach used (whether posterior or lateral), type of implant used (whether cemented or uncemented), duration of the surgery, intra-operative blood loss, time of start of full weight bearing (with support and without support) from the day of the surgery, the Harris Hip Score (HHS) noted periodically at <5 days, 4 weeks, 8 weeks, 3 months and 6 months from the date of surgery (and the functional outcome grade inferred from the final Harris Hip Score), and the incidence of complications.

INCLUSION CRITERIA

- All patients diagnosed as having fracture of neck of Femur and getting operated for Hemiarthroplasty using the posterior or lateral approach
- Patients who had given consent to undergo the procedure and are willing for follow-up
- Patients who could be followed-up upto 6 months duration

EXCLUSION CRITERIA

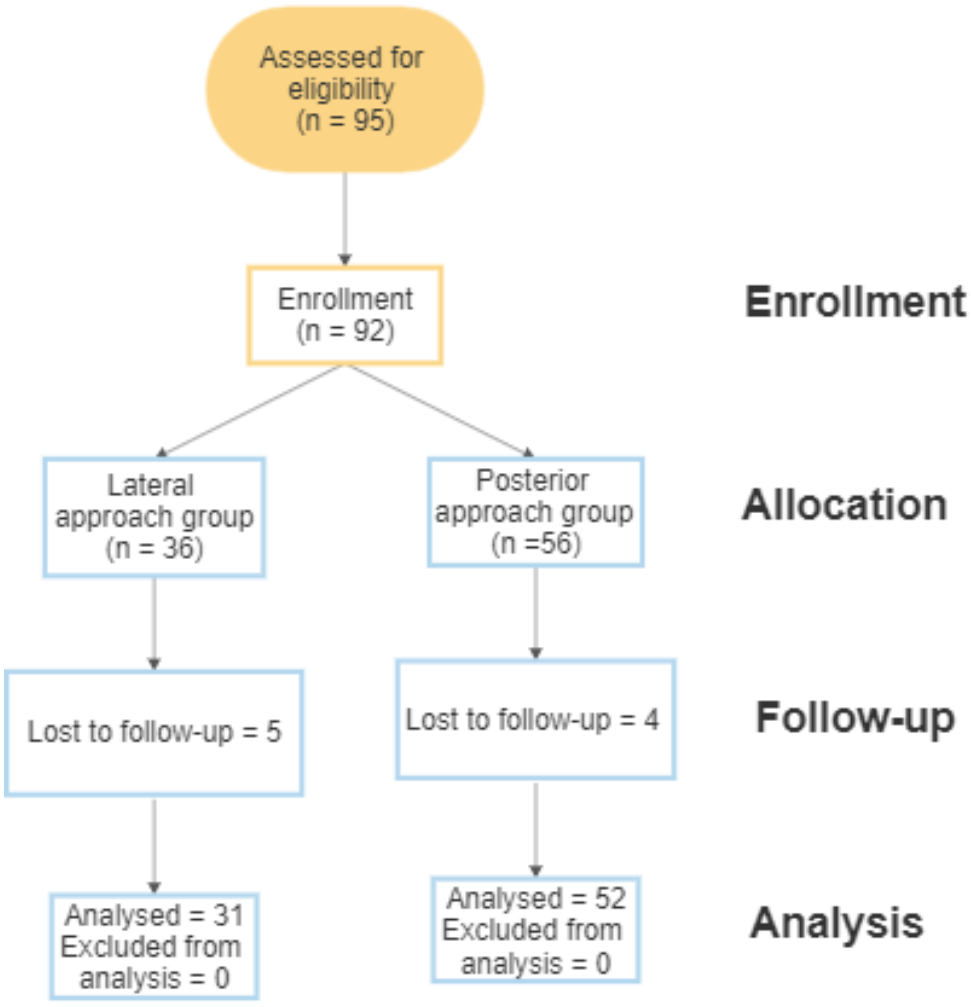
- Revision surgery
- Contralateral Hip surgery
- Pathological fractures

- Hemiarthroplasty done using approaches other than the posterior and lateral approach

The trauma patients reporting to casualty in Dayanand Medical College and Hospital, Ludhiana diagnosed with fracture of neck of Femur were be initially managed as per the ATLS protocol. After appropriate initial management and imaging and other routine investigations, the patients were operated for Hemiarthroplasty as a permanent fixation method. Physiotherapy like full weight bearing walking with walker of the affected side and quadriceps exercises were started as early as possible post-operatively. Patients were initiated into the study after obtaining necessary informed consent and serial follow up of the patients was made at 4 weeks, 6 weeks, 3 months, 6 months and the data was recorded in a standard performa.

Statistical analysis

Data was described in terms of range; mean ±standard deviation (± SD), frequencies (number of cases) and relative frequencies (percentages) as appropriate. Comparison of quantitative variables between the study groups was done using Student t-test and Mann Whitney U test for independent samples for parametric and non-parametric data respectively. For comparing categorical data, Chi square ($\chi 2$) test was performed and exact test was used when the expected frequency was less than 5. A probability value (p value) less than 0.05 was considered statistically significant. All statistical calculations were done using (Statistical Package for the Social Science) SPSS 21version (SPSS Inc., Chicago, IL, USA) statistical program for Microsoft Windows.


Assessed for eligibility (n = 95)
Enrollment (n = 92)
Enrollment
Lateral approach group (n = 36)
Posterior approach group (n =56)
Allocation
Lost to follow-up = 5
Lost to follow-up = 4
Follow-up
Analysed = 31 Excluded from analysis = 0
Analysed = 52 Excluded from analysis = 0
Analysis

Flow diagram of the present study

OBSERVATION AND RESULTS

TABLE 1A. AGE DISTRIBUTION OF CASES

AGE GROUP	**NUMBER OF CASES**	**PERCENTAGE**
<60 YEARS	8	9.63%
61-70 YEARS	30	36.14%
71-80 YEARS	26	31.32%
>80 YEARS	19	22.89%
TOTAL	83	100%

TABLE 1B. AGE DISTRIBUTION IN PATIENTS OPERATED WITH LATERAL AND POSTERIOR APPROACHES

AGE GROUP	LATERAL		POSTERIOR	
	NUMBER OF CASES	%AGE	NUMBER OF CASES	%AGE
<60 YEARS	4	12.9%	4	7.7%
61-70 YEARS	12	38.7%	18	34.6%
71-80 YEARS	9	29.0%	17	32.7%
>80 YEARS	6	19.4%	13	25.0%
TOTAL	31	100%	52	100%

TABLE 1C. MEAN AGE OF PATIENTS OPERATED WITH LATERAL APPROACH AND POSTERIOR APPROACH

	LATERAL APPROACH		POSTERIOR APPROACH	
	MEAN	SD	MEAN	SD
AGE	70.74	10.51	73.54	10.25

FIGURE 1A. AGE DISTRIBUTION OF CASES

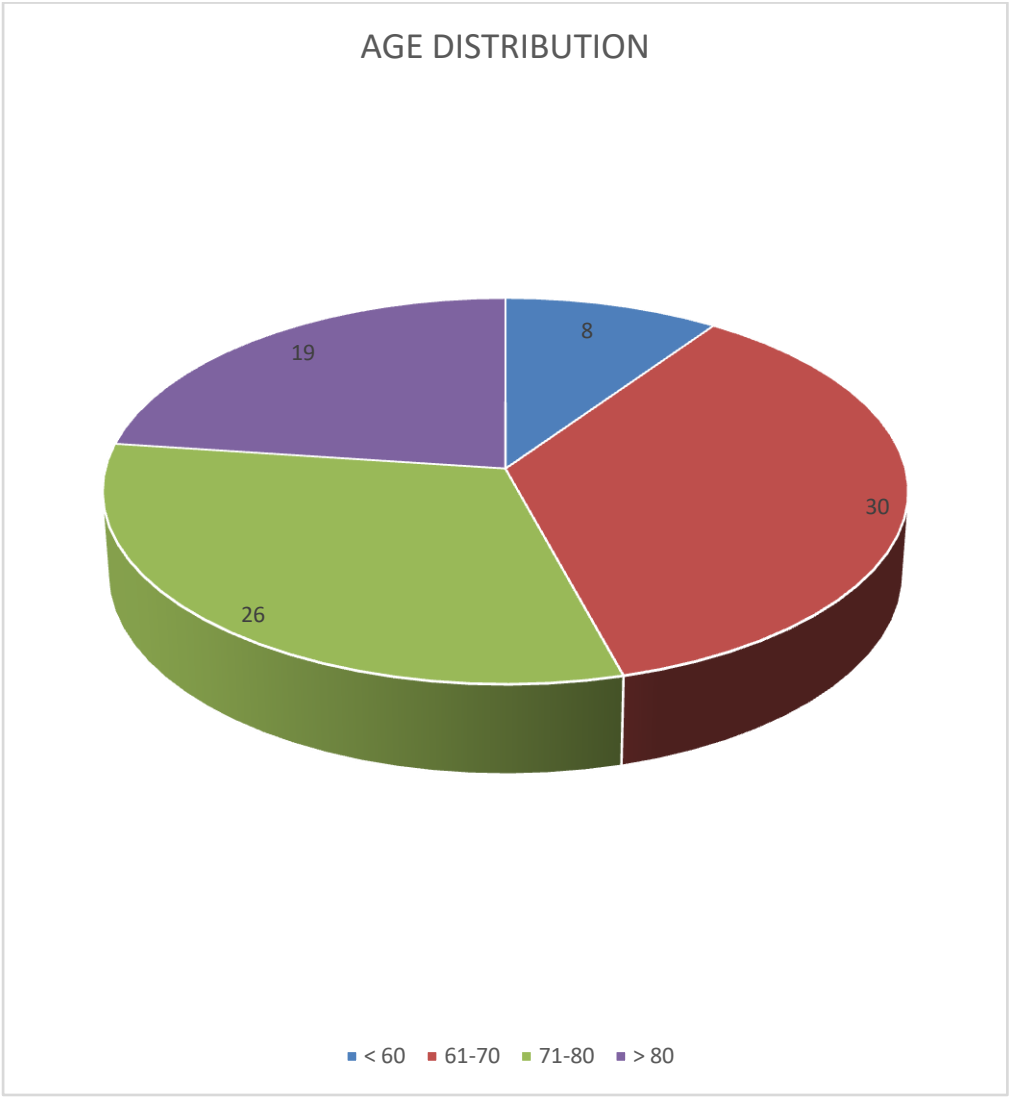


FIGURE 1B. AGE DISTRIBUTION IN PATIENTS OPERATED WITH LATERAL APPROACH

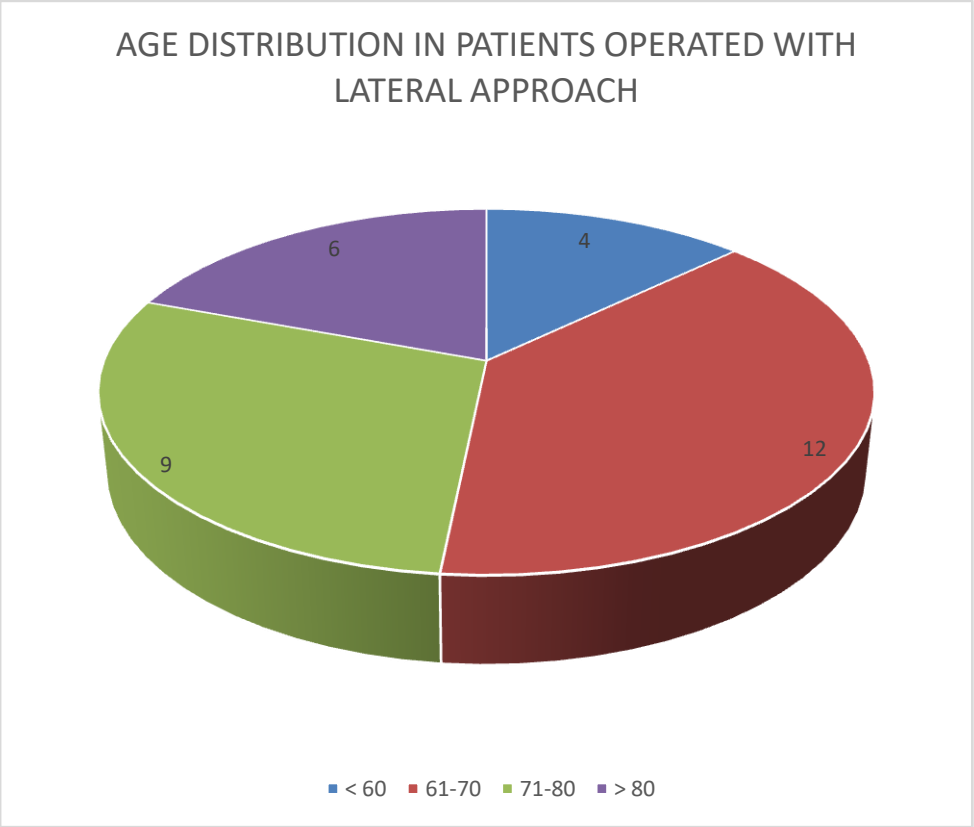


FIGURE 1C. AGE DISTRIBUTION IN PATIENTS OPERATED WITH POSTERIOR APPROACH

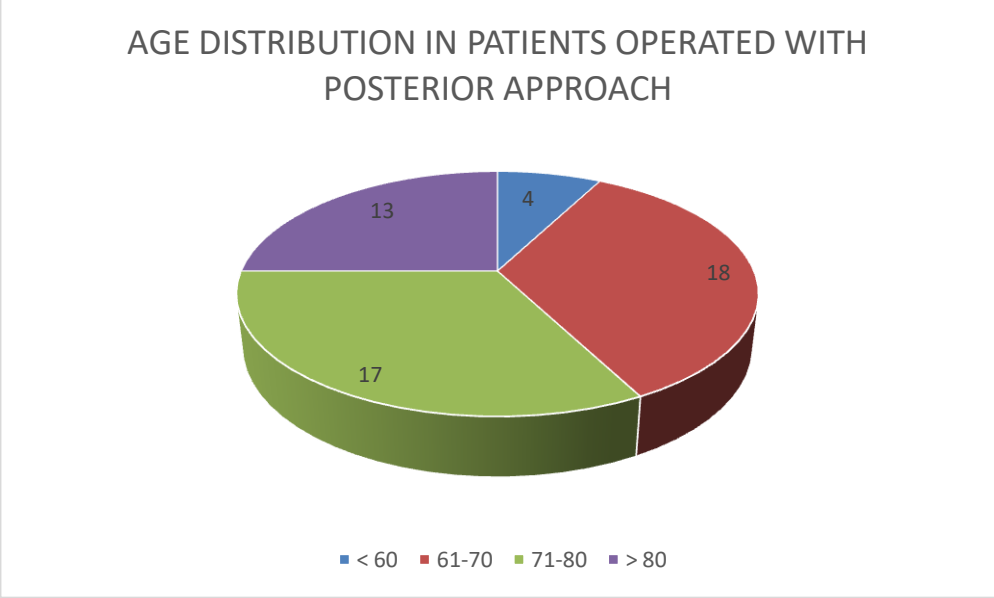
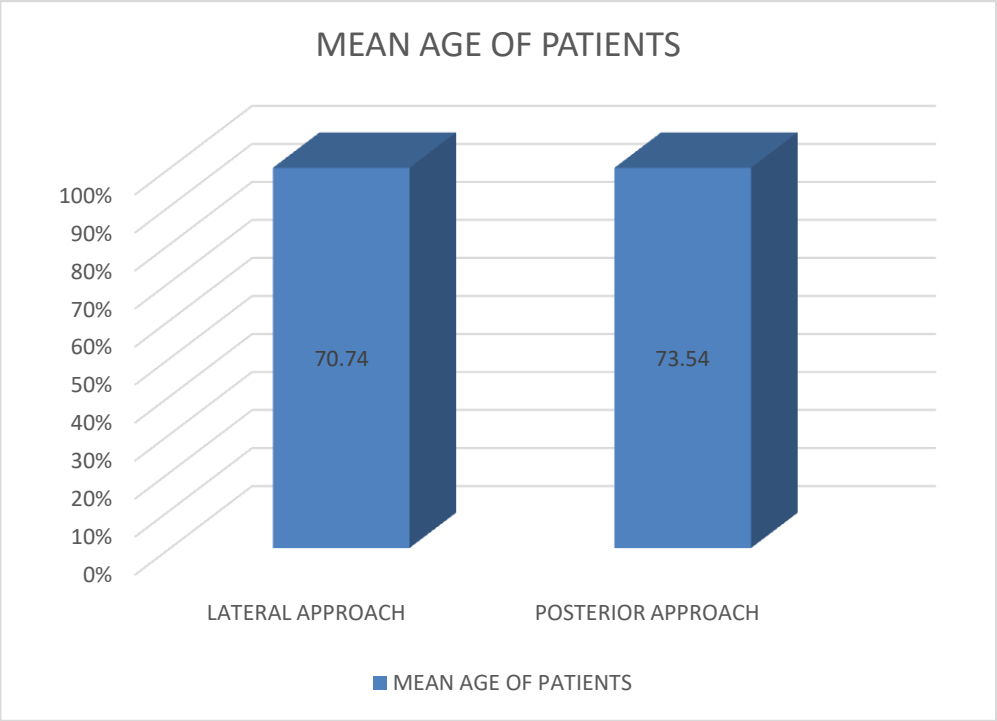


FIGURE 1D. MEAN AGE OF PATIENTS OPERATED WITH LATERAL AND POSTERIOR APPROACH



Of the total 83 patients, 8 patients belonged to the <60 years age group, 30 patients belonged to the 61-70 years age group, 26 patients belonged to the 71-80 years age group, 19 patients belonged to the >80 years age group. Of the 8 patients belonging to the <60 years age group, 4 patients were operated with lateral approach and 4 patients were operated with posterior approach. Of the 30 patients belonging to the 61-70 years age group, 12 patients were operated with lateral approach and 18 patients were operated with posterior approach. Of the 26 patients belonging to the 71-80 years age group, 9 patients were operated with lateral approach and 17 patients were operated with posterior approach. Of the 19 patients belonging to the >80 years age group, 6 patients were operated with lateral approach and 13 patients were operated with posterior approach.

The mean age of patients operated with lateral approach was 70.74 years and the mean age of patients operated with posterior approach was 73.54 years.

TABLE 2A. SEX DISTRIBUTION OF CASES

SEX	NUMBER OF CASES	PERCENTAGE
FEMALE	43	51.80%
MALE	40	48.19%
TOTAL	83	100%

TABLE 2B. SEX DISTRIBUTION IN PATIENTS OPERATED WITH LATERAL AND POSTERIOR APPROACH

	APPROACH	LATERAL		POSTERIOR	
		NO. OF CASES	%AGE	NO.OF CASES	%AGE
SEX	FEMALE	14	45.2%	29	55.8%
	MALE	17	54.8%	33	44.2%
TOTAL		31	100%	52	100%

FIGURE 2A. SEX DISTRIBUTION OF CASES

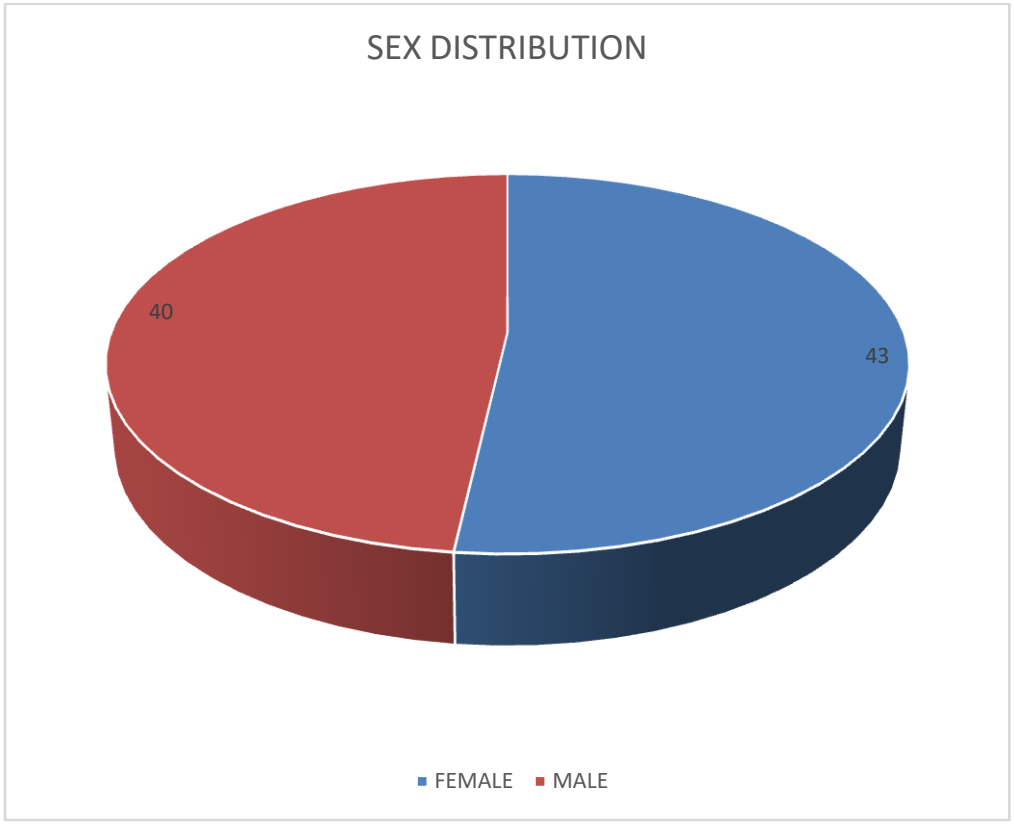


FIGURE 2B. SEX DISTRIBUTION IN PATIENTS OPERATED WITH LATERAL APPROACH

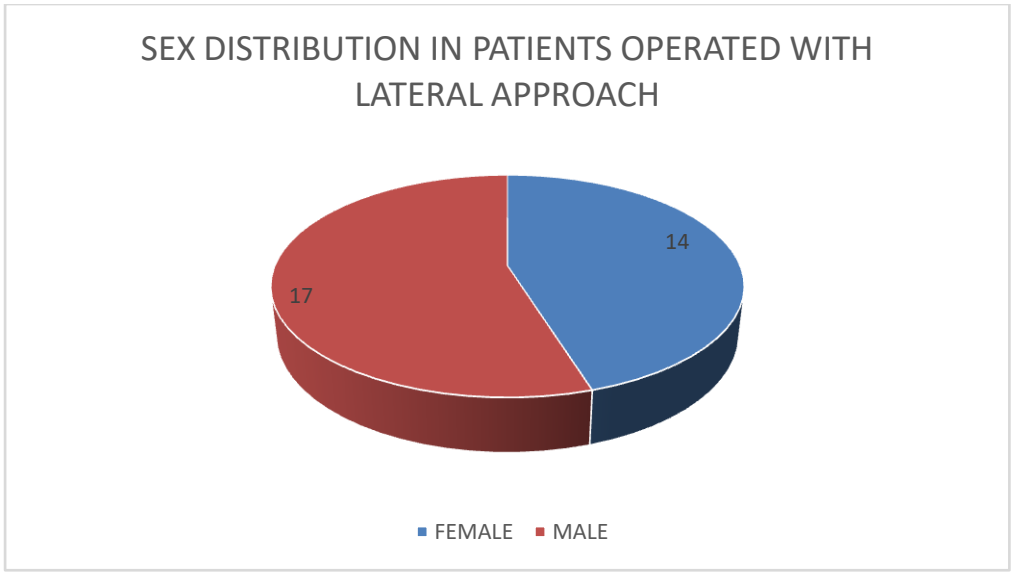
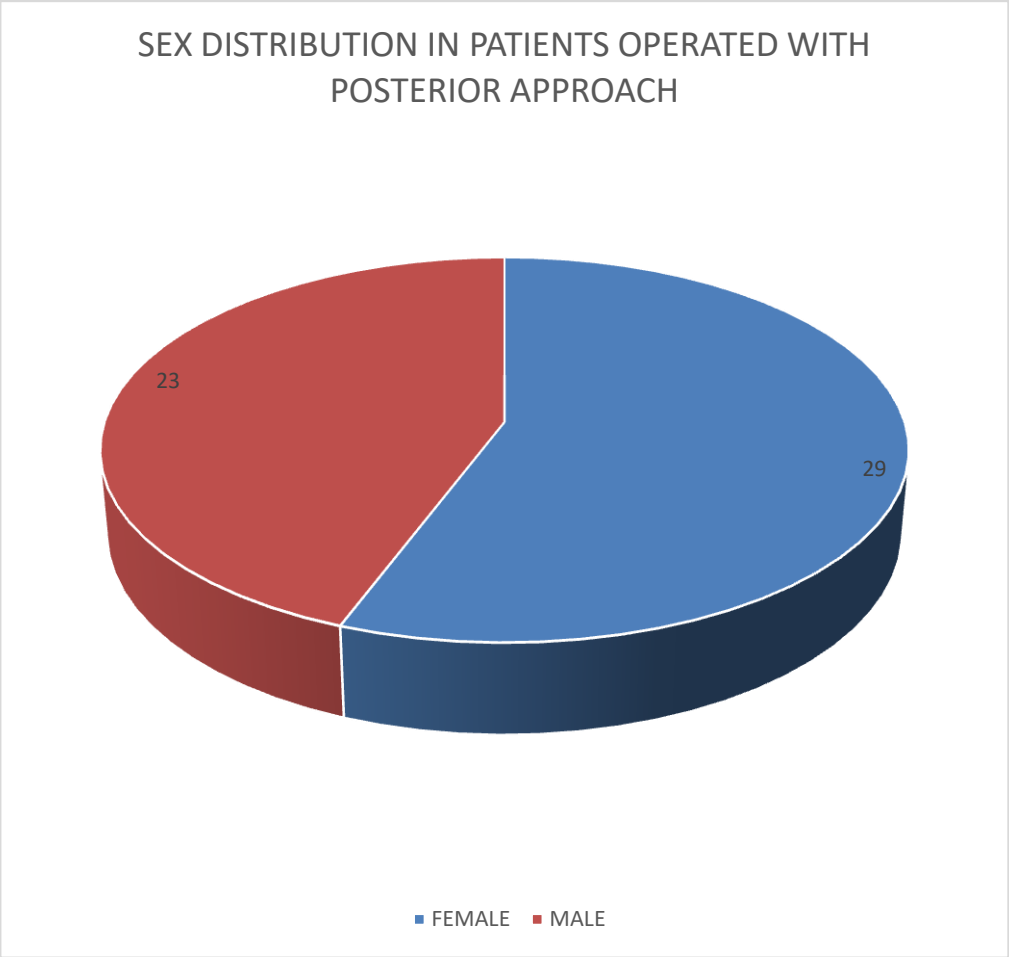


FIGURE 2C. SEX DISTRIBUTION IN PATIENTS OPERATED WITH POSTERIOR APPROACH

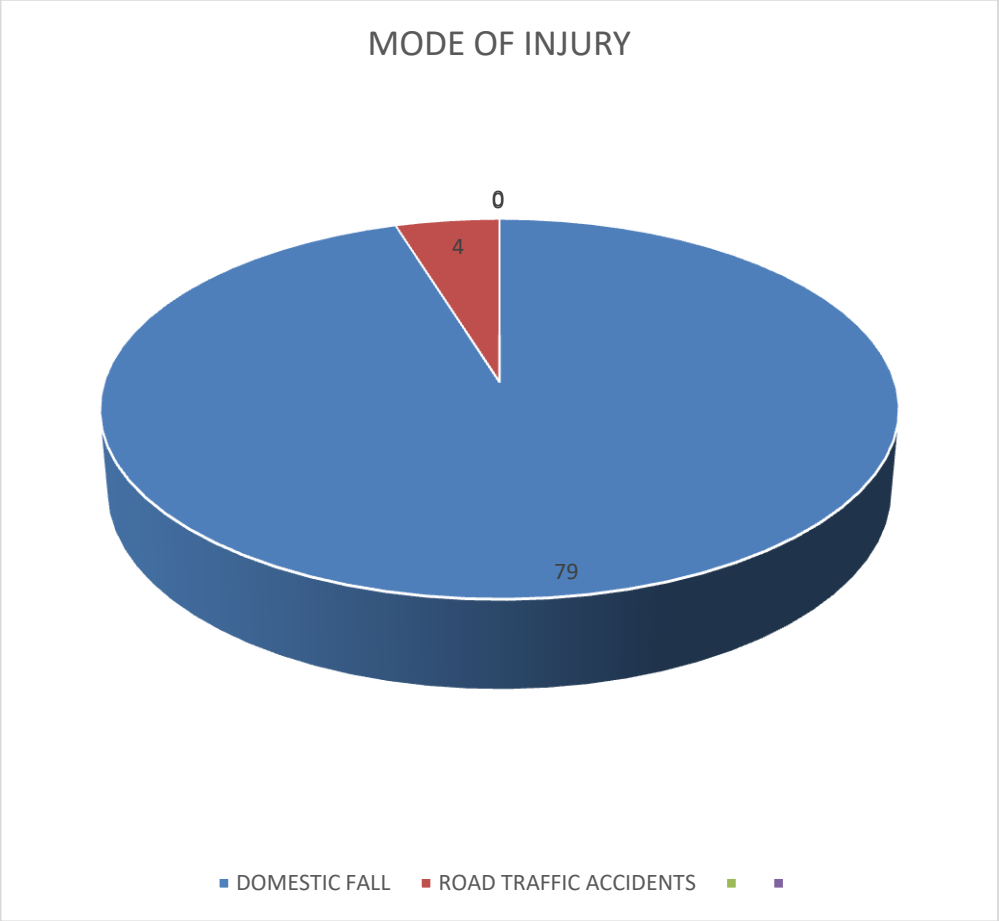


Of the 83 patients, there were 43 Female patients (51.80%) and 40 Male patients (48.19%). Of the 43 Female patients, 14 patients were operated with lateral approach and 29 were operated with lateral approach. Of the 40 Male patients, 17 patients were operated with lateral approach and 23 were operated with posterior approach.

TABLE 3. DISTRIBUTION OF THE MODE OF INJURY

MODE OF INJURY	NUMBER OF CASES	PERCENTAGE
DOMESTIC FALL	79	95.18%
ROAD TRAFFIC ACCIDENTS	4	4.81%
TOTAL	83	100%

FIGURE 3. DISTRIBUTION OF THE MODE OF INJURY

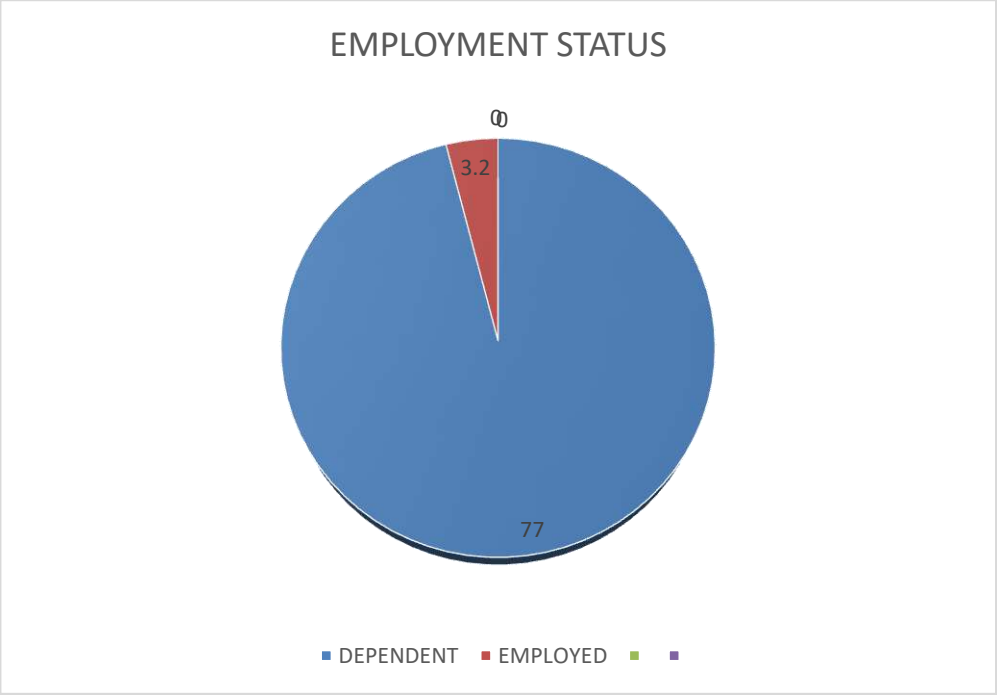


Out of the total, the mechanism of injury was domestic fall in 79 patients (95.18%) while it was road traffic accidents in 4 patients (4.81%)

TABLE 4. EMPLOYMENT STATUS OF THE PATIENTS

EMPLOYMENT STATUS	NUMBER OF CASES	PERCENTAGE
DEPENDENT	77	92.77%
EMPLOYED	6	7.22%
TOTAL	83	100%

FIGURE 4. EMPLOYMENT STATUS OF THE PATIENTS

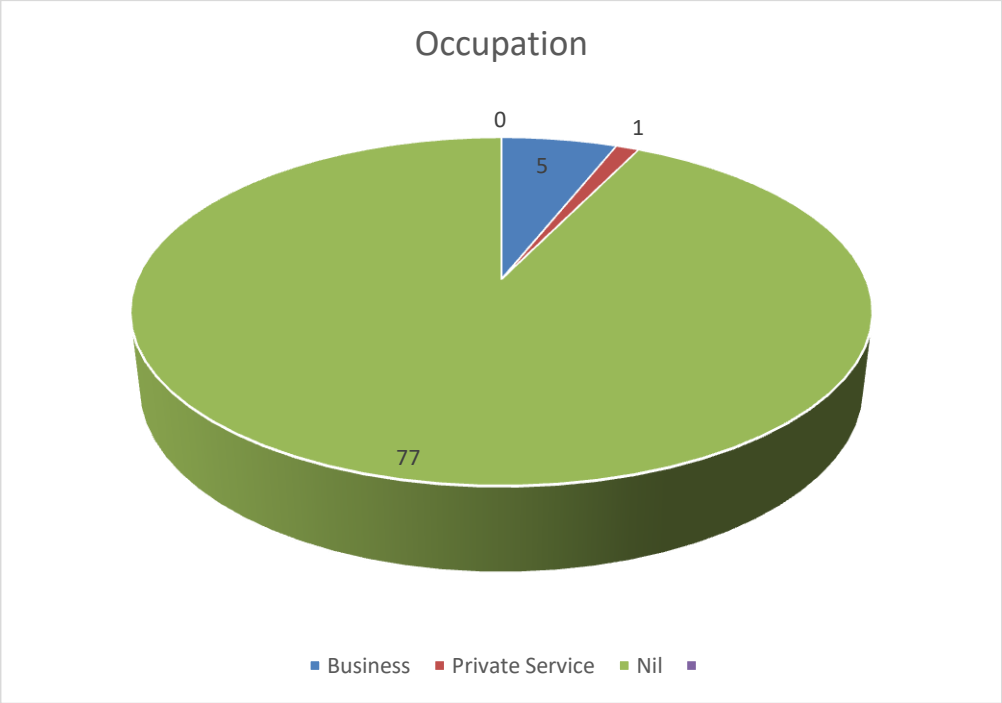


Out of the total patients, 77 patients (92.77%) were dependent while 6 patients (7.22%) were employed.

TABLE 5. OCCUPATION OF THE PATIENTS

OCCUPATION	NUMBER OF CASES	PERCENTAGE
BUSINESS	5	6.02%
PRIVATE SERVICE	1	1.20%
NIL	77	92.77%
TOTAL	83	100%

FIGURE 5. OCCUPATION OF THE PATIENTS

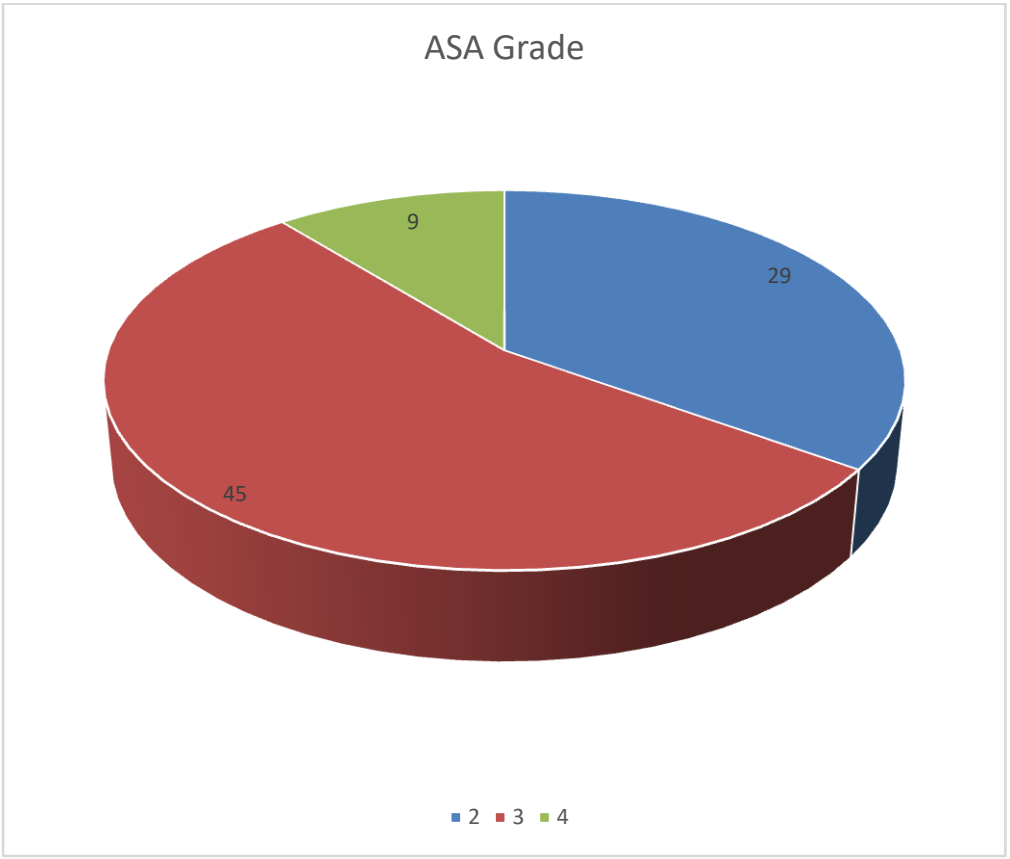


Of the total 83 patients, 6 were employed, out of which 5 patients (6.02%) did business while one patient (1.20%) did private service. 77 patients (92.77%) were dependent/not-employed.

TABLE 6. ASA GRADE OF THE PATIENTS

ASA GRADE	NUMBER OF CASES	PERCENTAGE
2	29	34.93%
3	45	54.21%
4	9	10.84%
TOTAL	83	100%

FIGURE 6. ASA GRADE OF THE PATIENTS



Of the total 83 patients, 29 belonged to the ASA grade 2, 45 belonged to the ASA grade 3, and 9 patients belonged to the ASA grade 4.

TABLE 7A. DISTRIBUTION OF GARDEN TYPE OF THE FRACTURE IN PATIENTS

GARDEN TYPE	NUMBER OF CASES	PERCENTAGE
3	28	33.73%
4	55	66.26%
TOTAL	83	100%

TABLE 7B. DISTRIBUTION OF GARDEN TYPE OF THE FRACTURE IN PATIENTS OPERATED WITH LATERAL AND POSTERIOR APPROACH

	APPROACH	LATERAL		POSTERIOR	
		NO.OF CASES	%AGE	NO.OF CASES	%AGE
GARDEN TYPE	3	9	29.0%	19	36.5%
	4	22	71.0%	33	63.5%
		31	100%	52	100%

FIGURE 7A. DISTRIBUTION OF GARDEN TYPE OF THE FRACTURE IN PATIENTS

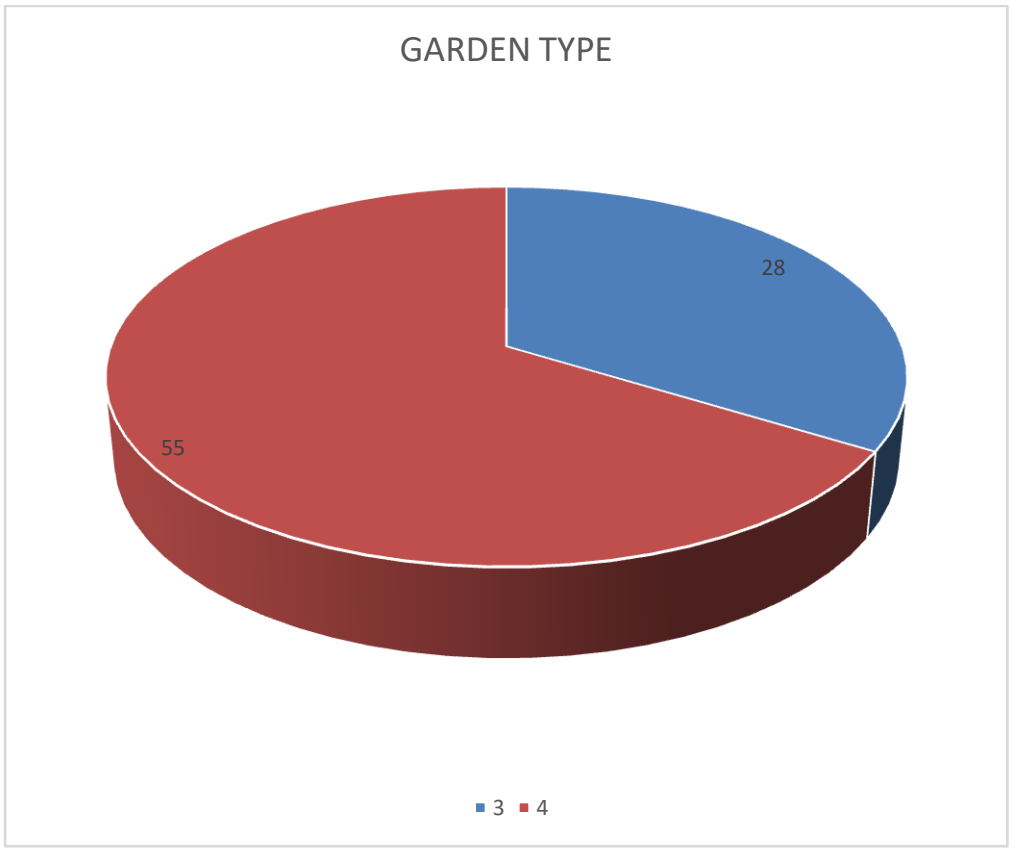


FIGURE 7B. DISTRIBUTION OF GARDEN TYPE OF THE FRACTURE IN PATIENTS OPERATED WITH LATERAL APPROACH

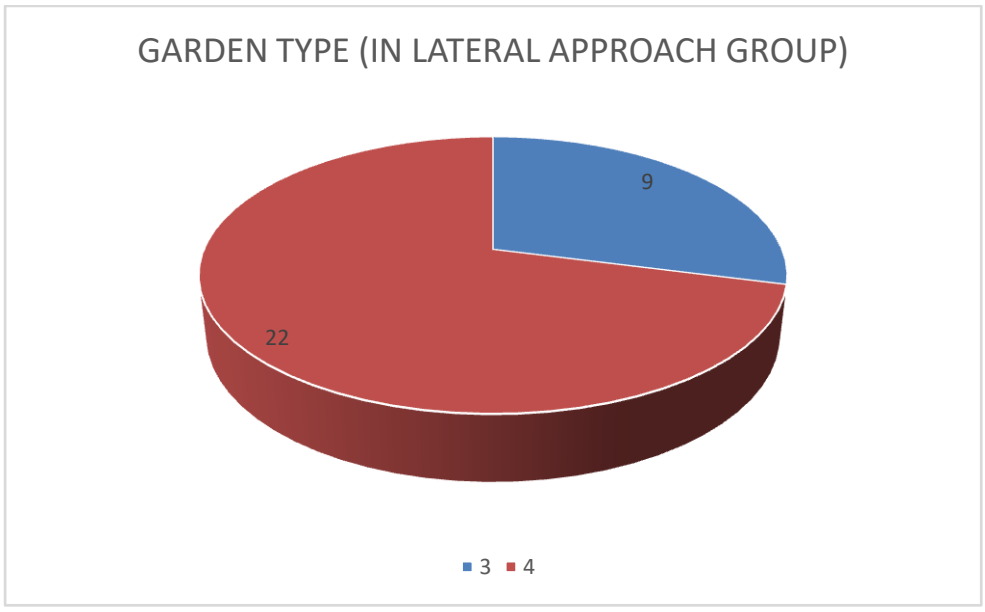
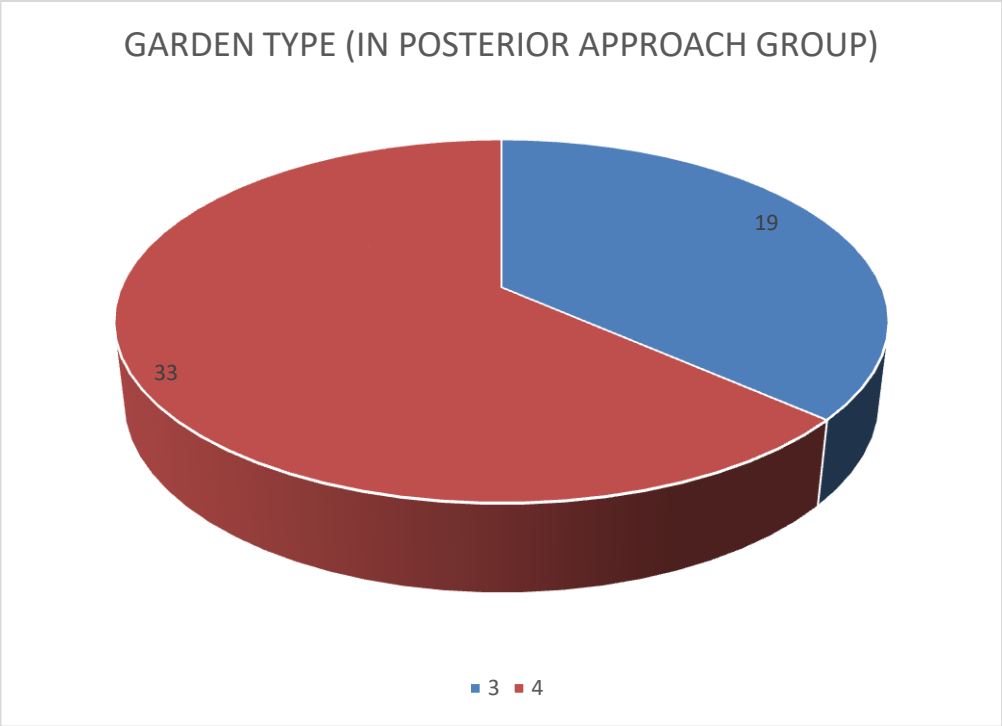


FIGURE 7C. DISTRIBUTION OF GARDEN TYPE OF THE FRACTURE IN PATIENTS OPERATED WITH POSTERIOR APPROACH

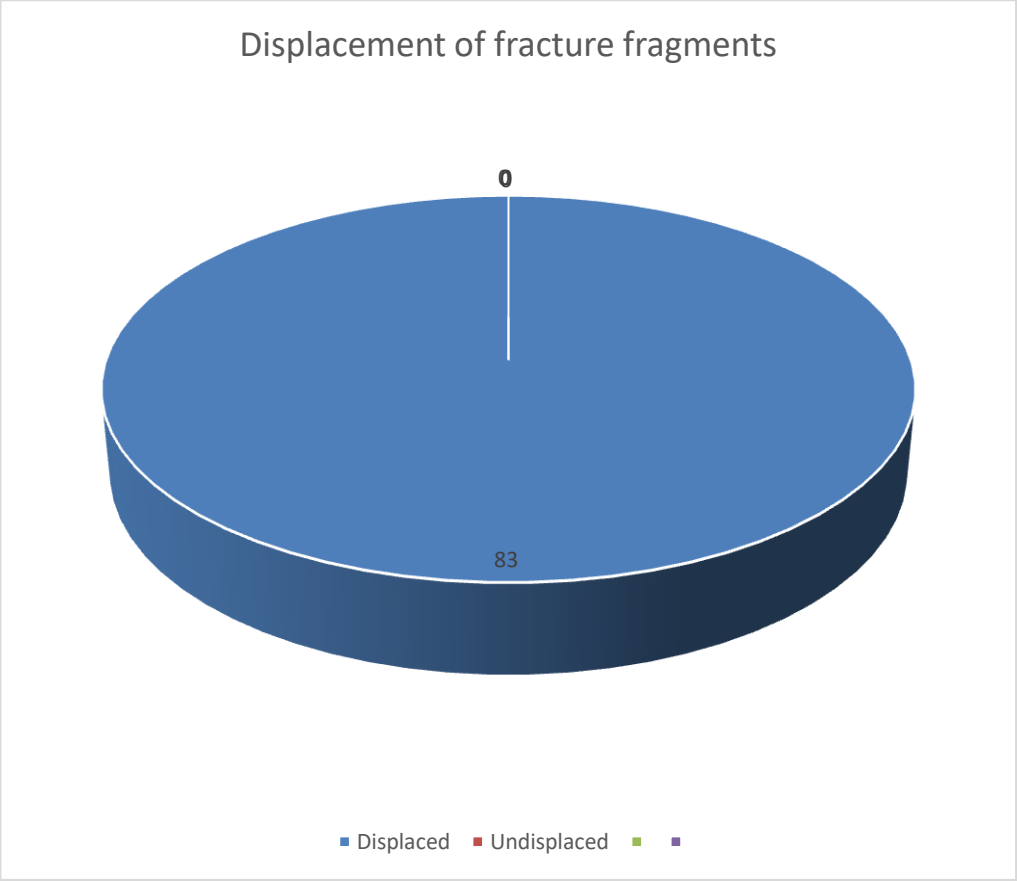


Out of the total 83% patients, fractures of 28 patients (33.73%) belonged to Garden type 3 and fractures of 55 patients (66.26%) belonged to Garden type 4. Out of the total 31 patients operated with the lateral approach, fractures of 9 patients (29.0%) belonged to Garden type 3, while fractures of 22 patients (71.0%) belonged to Garden type 4. Of the total 52 patients operated with the posterior approach, fractures of 19 patients (36.5%) belonged to Garden type 3, while fractures of 33 patients (63.5%) belonged to Garden type 4.

TABLE NO 8. DISPLACEMENT OF FRACTURE FRAGMENTS

DISPLACEMENT	NUMBER OF CASES	PERCENTAGE
DISPLACED	83	100%
UNDISPLACED	NIL	NIL
TOTAL	83	100%

FIGURE 8. DISPLACEMENT OF FRACTURE FRAGMENTS



Of the total 83 patients, in 83 patients (100%) fracture fragments were displaced.

TABLE 9A. TYPE OF IMPLANT USED IN PATIENTS OPERATED FOR HEMIARTHROPLASTY

IMPLANT USED	NUMBER OF CASES	PERCENTAGE
CEMENTED	72	86.74%
UNCEMENTED	11	13.25%
TOTAL	83	100%

TABLE 9B. TYPE OF IMPLANT USED IN PATIENTS OPERATED WITH LATERAL AND POSTERIOR APPROACH

	APPROACH	LATERAL		POSTERIOR	
		NO. OF CASES	%AGE	NO.OF CASES	%AGE
IMPLANT USED	CEMENTED	26	83.9%	46	88.5%
	UNCEMENTED	5	16.1%	6	11.5%
		31	100.0%	52	100.0%

FIGURE 9A. TYPE OF IMPLANT USED IN PATIENTS OPERATED FOR HEMIARTHROPLASTY

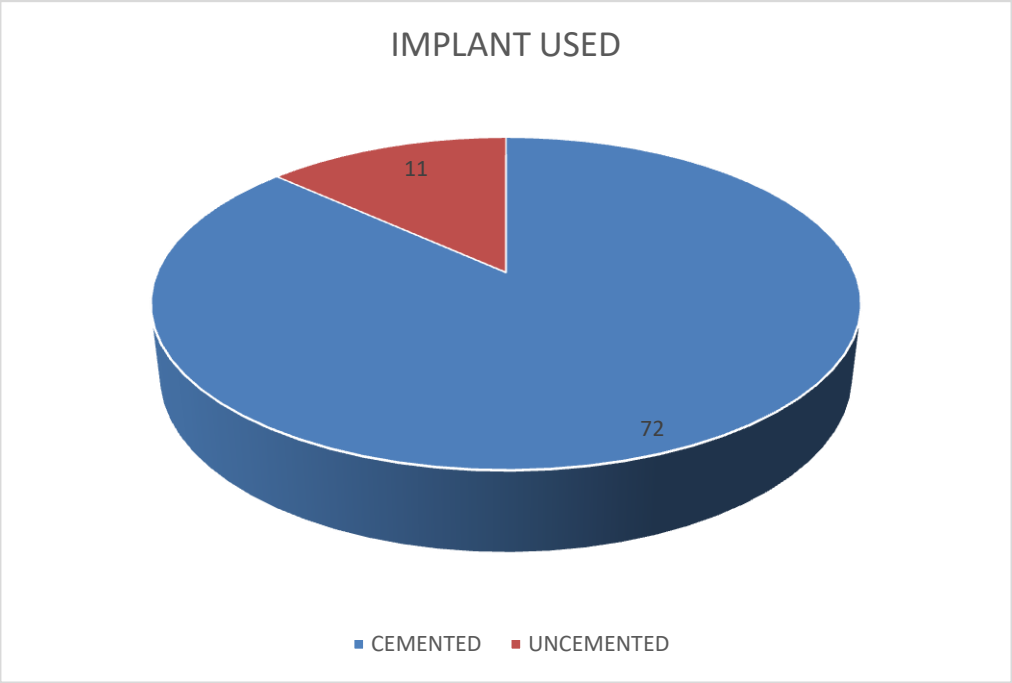


FIGURE 9B. TYPE OF IMPLANT USED IN PATIENTS OPERATED WITH LATERAL APPROACH

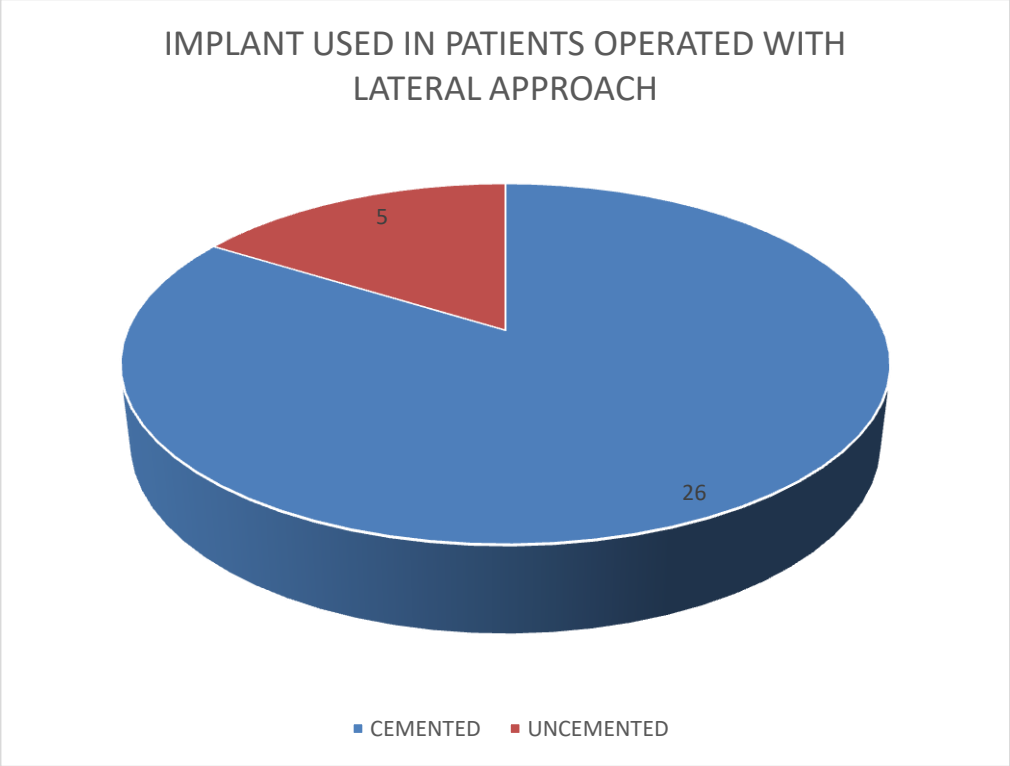
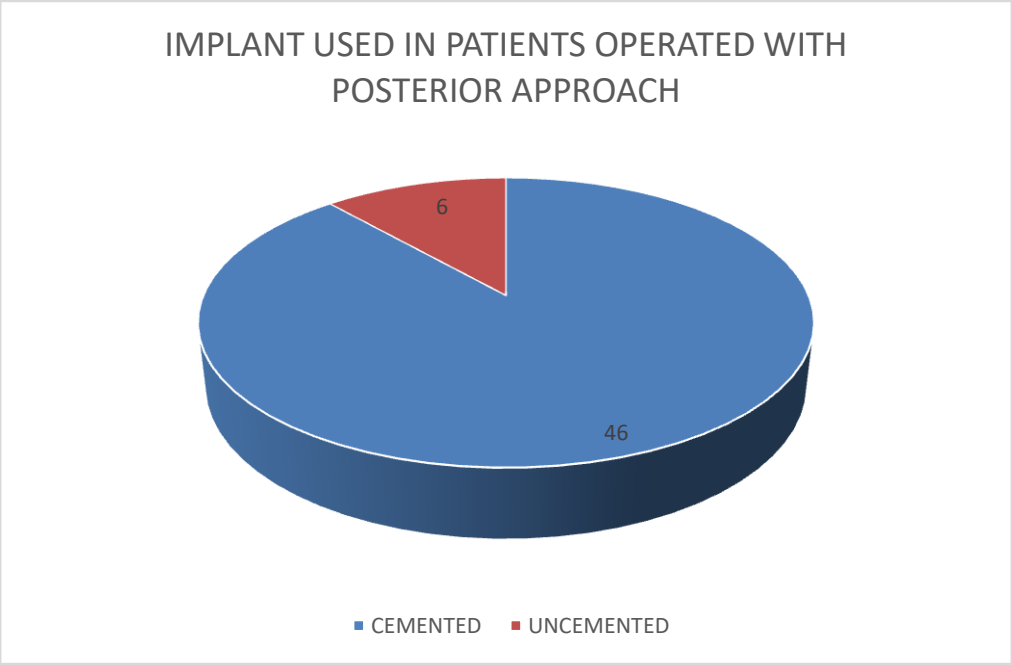


FIGURE 9C. TYPE OF IMPLANT USED IN PATIENTS OPERATED WITH POSTERIOR APPROACH



Of the total 83 patients, cemented implant was used in 72 cases (86.74%), and uncemented implant was used in 11 cases (13.25%). Of the total 31 cases operated with lateral approach, cemented implant was used in 26 cases, and uncemented implant was used in 5 cases. Of the total 52 cases operated with posterior approach, cemented implant was used in 46 cases, and uncemented implant was used in 6 cases.

TABLE 10A. TYPE OF ANESTHESIA ADMINISTERED IN PATIENTS OPERATED FOR HEMIARTHROPLASTY

TYPE OF ANAESTHESIA	NUMBER OF CASES	PERCENTAGE
CSE	6	7.79%
SA	77	92.77%
TOTAL	83	100%

TABLE 10B. TYPE OF ANAESTHESIA ADMINISTERED IN PATIENTS OPERATED WITH LATERAL APPROACH AND POSTERIOR APPROACH

	APPROACH	LATERAL		POSTERIOR	
		NO. OF CASES	%AGE	NO.OF CASES	%AGE
ANAESTHESIA ADMINISTERED	CSE	3	9.7%	3	5.8%
	SA	28	90.3%	49	94.2%
	TOTAL	31	100.0%	52	100.0%

FIGURE 10A. TYPE OF ANESTHESIA ADMINISTERED IN PATIENTS OPERATED FOR HEMIARTHROPLASTY

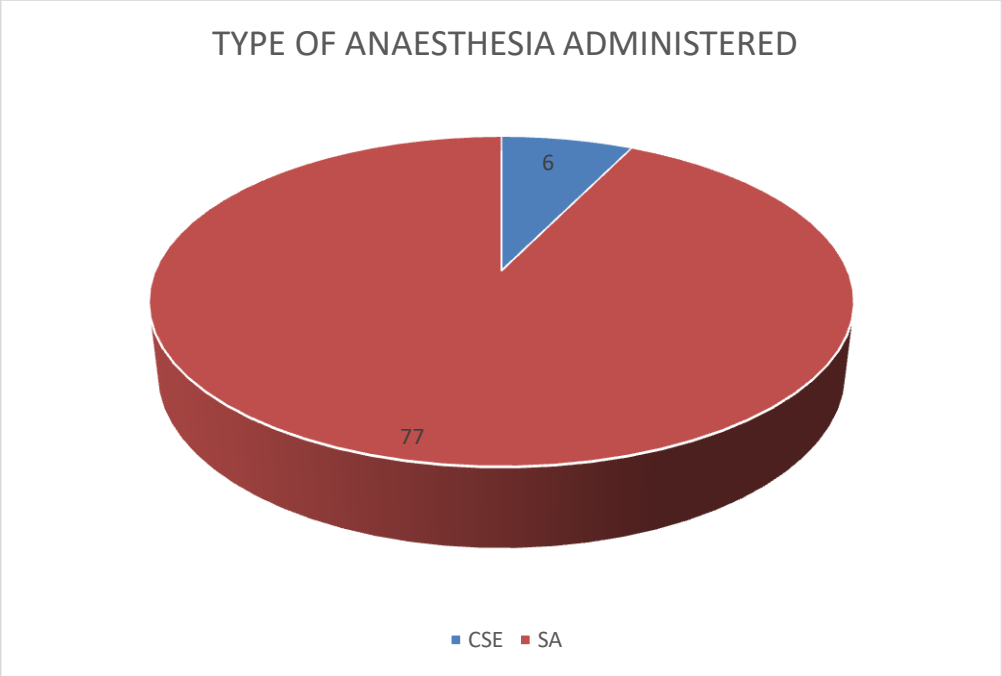


FIGURE 10B. TYPE OF ANAESTHESIA ADMINISTERED IN PATIENTS OPERATED WITH LATERAL APPROACH

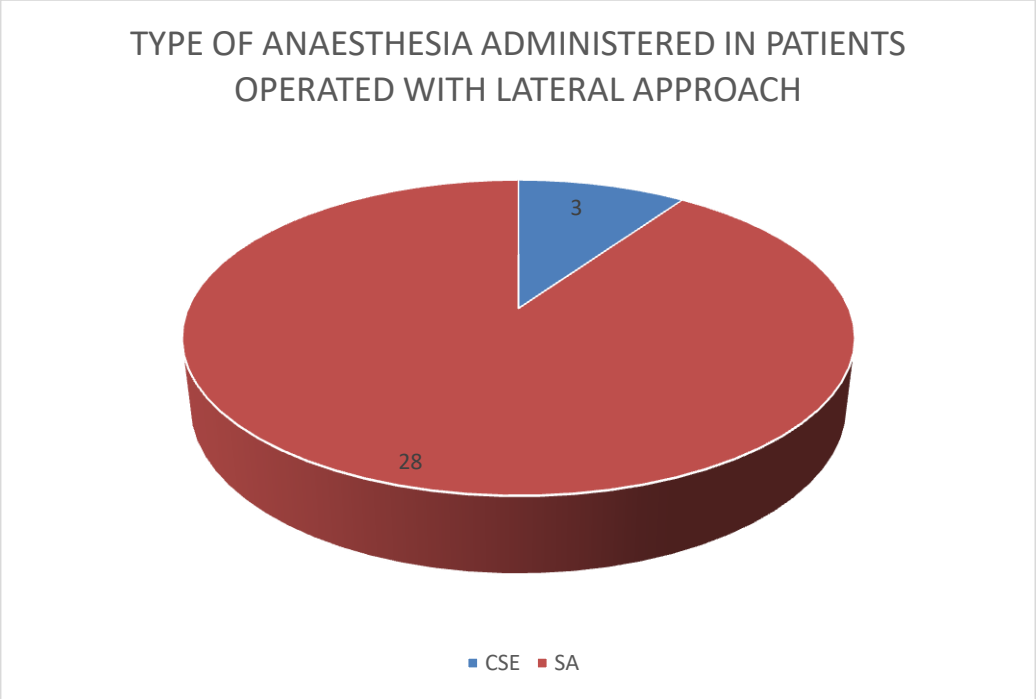
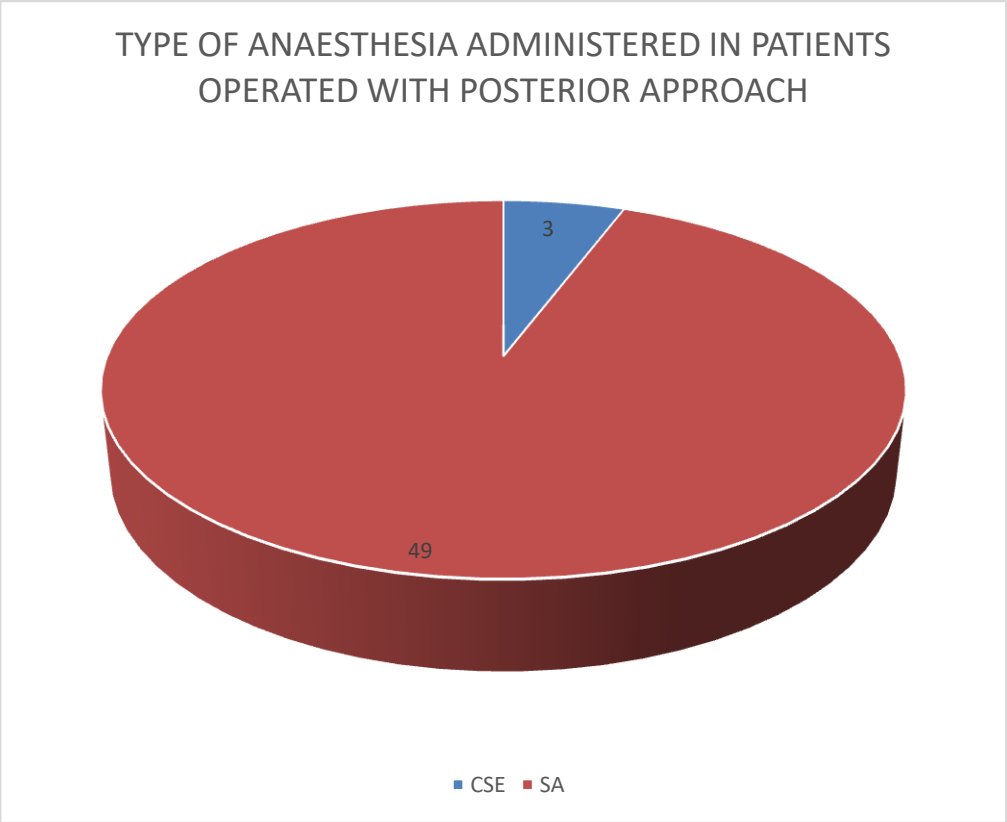


FIGURE 10C. TYPE OF ANAESTHESIA ADMINISTERED IN PATIENTS OPERATED WITH POSTERIOR APPROACH



Of the total 83 patients, Combined spinal epidural anesthesia (CSE) was administered in 6 patients and spinal anesthesia (SA) was administered in 77 patients. Of the total 31 patients operated with the lateral approach, CSE was administered in 3 patients (9.7%) and SA was administered in 28 patients (90.3%). Of the total 52 patients operated with the lateral approach, CSE was administered in 3 patients (5.8%) and SA was administered in 28 patients (94.2%).

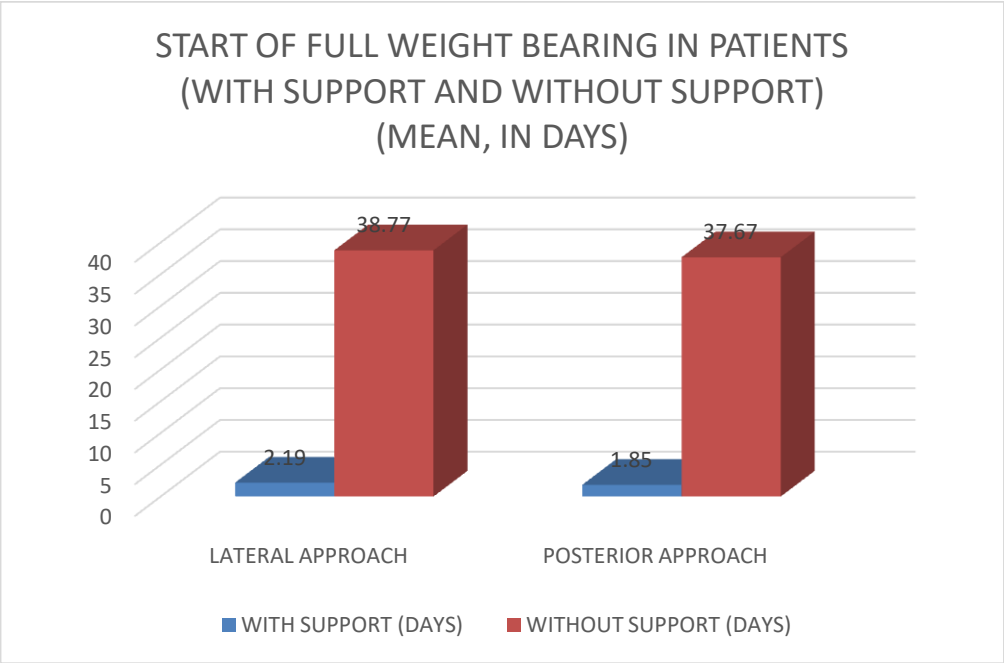
TABLE 11A. START OF FULL WEIGHT BEARING IN PATIENTS (WITH SUPPORT) (IN DAYS)

	APPROACH	**LATERAL**		**POSTERIOR**	
		NO. OF CASES	%AGE	NO.OF CASES	%AGE
START OF FULL WEIGHT BEARING (WITH SUPPORT) (DAYS)	1	11	35.5%	22	42.3%
	2	8	25.8%	18	34.6%
	3	7	22.6%	10	19.2%
	4	5	16.1%	2	3.8%
TOTAL		31	100.0%	52	100.0%

TABLE 11B. START OF FULL WEIGHT BEARING IN PATIENTS (WITH SUPPORT AND WITHOUT SUPPORT) (MEAN, IN DAYS)

	LATERAL APPROACH		POSTERIOR APPROACH		P VALUE
	MEAN	SD	MEAN	SD	
WITH SUPPORT (DAYS)	2.19	1.11	1.85	0.87	0.117
WITHOUT SUPPORT (DAYS)	38.77	10.73	37.67	8.65	0.512

FIGURE 11A. START OF FULL WEIGHT BEARING IN PATIENTS (WITH SUPPORT) (IN DAYS)

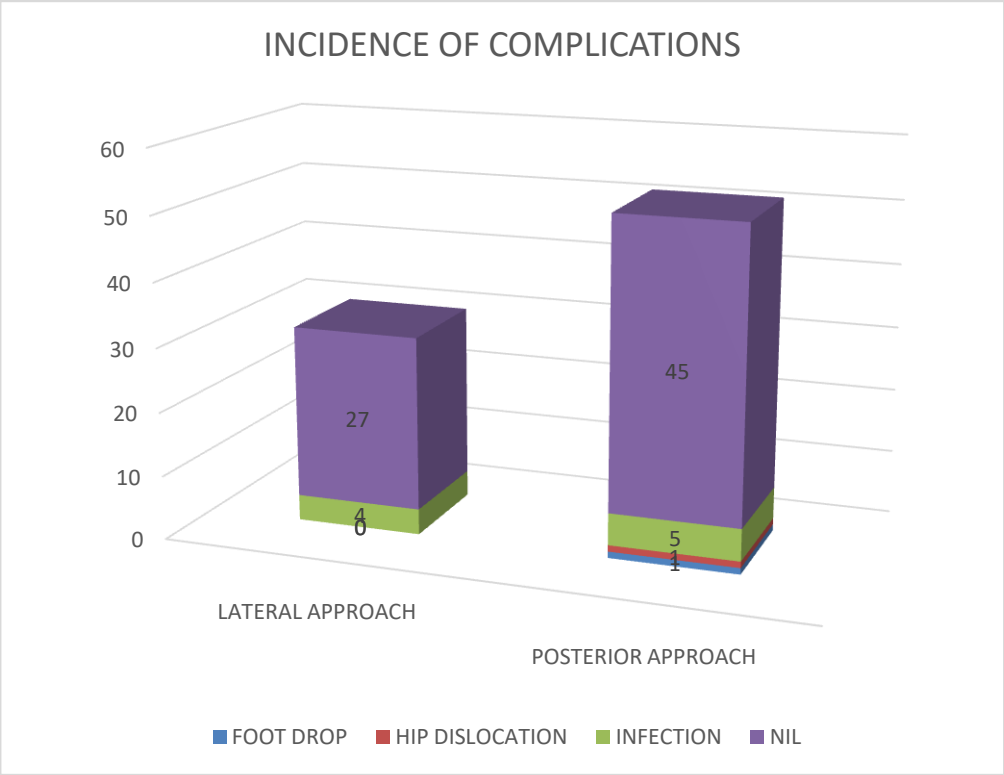


Of the patients operated with lateral approach, start of full weight bearing with support (walking aids, stick etc.) was started after a mean of 2.19 days from the day of surgery, and the start of full weight bearing without support was started after a mean of 38.77 days. Of the patients operated with posterior approach, start of full weight bearing with support was started after a mean of 1.85 days from the day of surgery, and the start of full weight bearing without support was started after a mean of 37.67 days.

TABLE 12. INCIDENCE OF COMPLICATIONS

	APPROACH	LATERAL		POSTERIOR		TOTAL	CHI-SQUARE VALUE	P-VALUE
		NO. OF CASES	%AGE	NO. OF CASES	%AGE		1.387	0.709
COMPLICATIONS	FOOT DROP	0	0.0%	1	1.9%	1		
	HIP DISLOCATION	0	0.0%	1	1.9%	1		
	INFECTION	4	12.9%	5	9.6%	9		
	NIL	27	87.1%	45	86.5%	72		
TOTAL		31	100%	52	100%	83		

FIGURE 12. INCIDENCE OF COMPLICATIONS

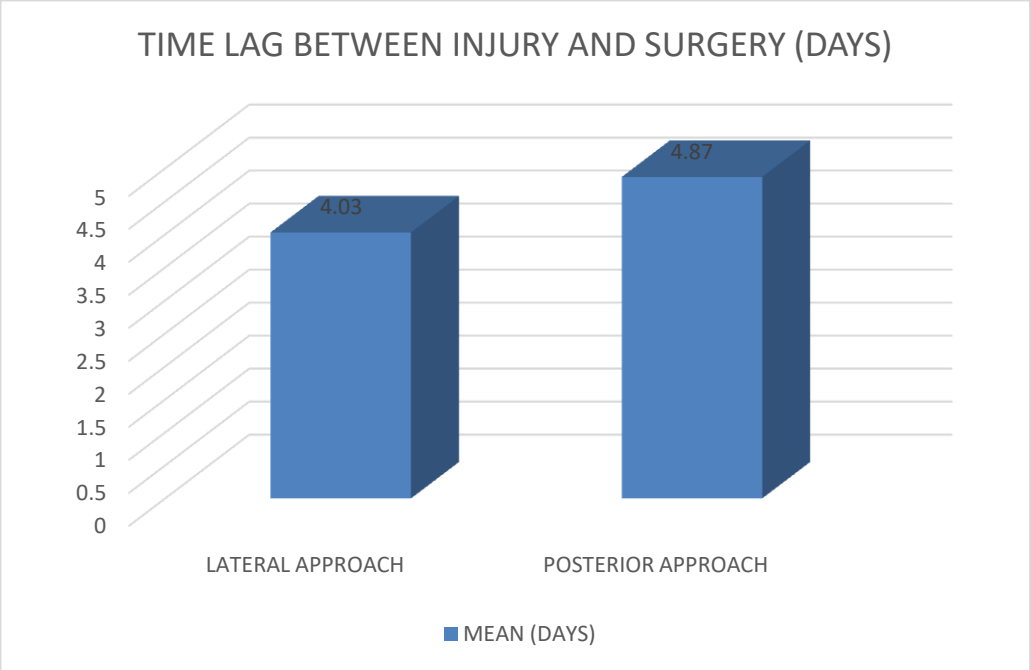


Of the total 83 patients, foot drop was seen in one patient who had been operated with posterior approach. Hip dislocation was seen in one patient who had been operated with posterior approach. Infection was seen in 9 patients, out of which 4 patients had been operated with lateral approach and 5 patients had been operated with posterior approach. No incidence of complications was seen in the rest of the 27 patients (87.1%) operated with lateral approach and 45 patients (86.5%) operated with posterior approach.

TABLE 13. TIME LAG BETWEEN INJURY AND SURGERY

	LATERAL APPROACH		POSTERIOR APPROACH		P-VALUE
	MEAN	SD	MEAN	SD	
TIME LAG BETWEEN INJURY AND SURGERY (DAYS)	4.03	7.26	4.87	12.75	0.740

FIGURE 13. TIME LAG BETWEEN INJURY AND SURGERY

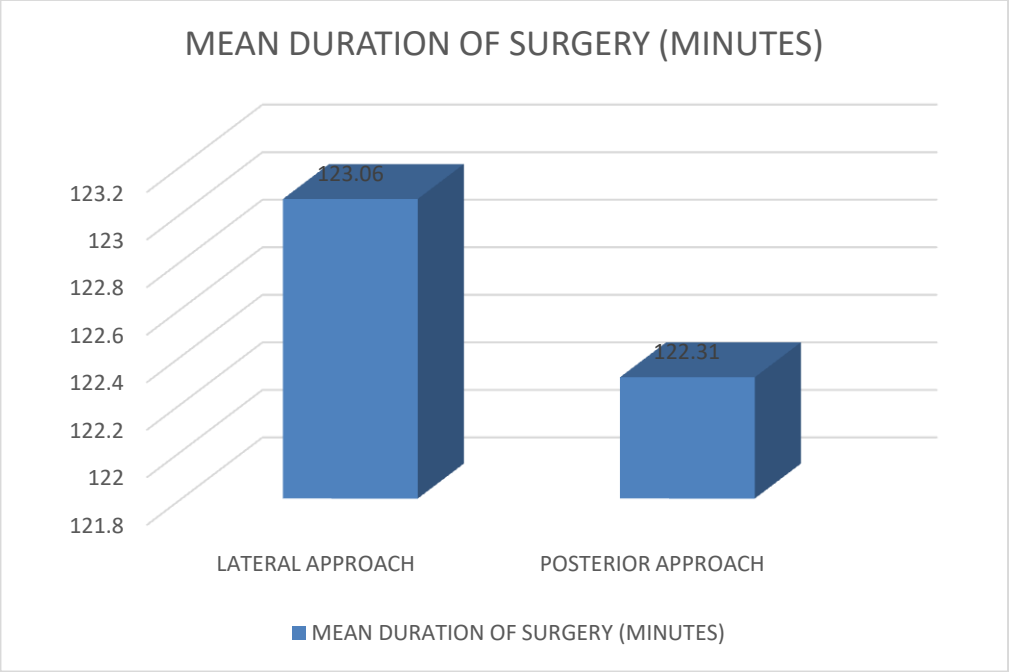


Time lag between the time of injury and the time of surgery was a mean of 4.03 days in patients operated with lateral approach, and a mean of 4.87 days in patients operated with posterior approach.

TABLE 14. DURATION OF SURGERY

	LATERAL APPROACH		POSTERIOR APPROACH		P-VALUE
	MEAN	SD	MEAN	SD	
DURATION OF SURGERY (MINUTES)	123.06	13.89	122.31	15.23	0.822

FIGURE 14. DURATION OF SURGERY

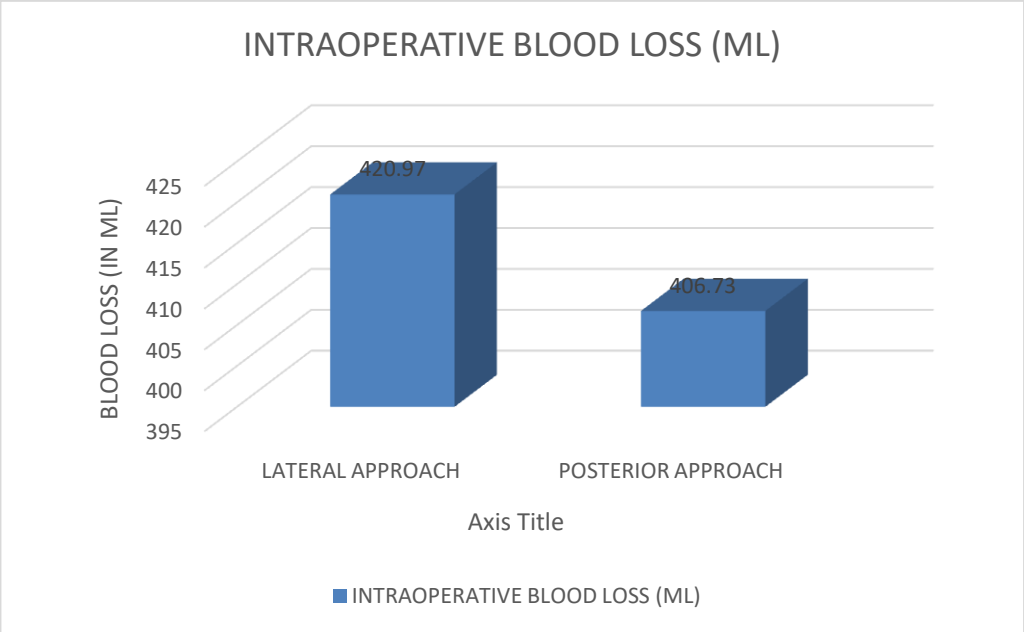


Mean duration of surgery was 123.06 minutes in patients operated with lateral approach, and 122.31 minutes in patients operated with posterior approach.

TABLE 15. INTRAOPERATIVE BLOOD LOSS

	LATERAL APPROACH		POSTERIOR APPROACH		P-VALUE
	MEAN	SD	MEAN	SD	
INTRAOPERATIVE BLOOD LOSS (ML)	420.97	77.82	406.73	68.62	0.386

FIGURE 15. INTRAOPERATIVE BLOOD LOSS

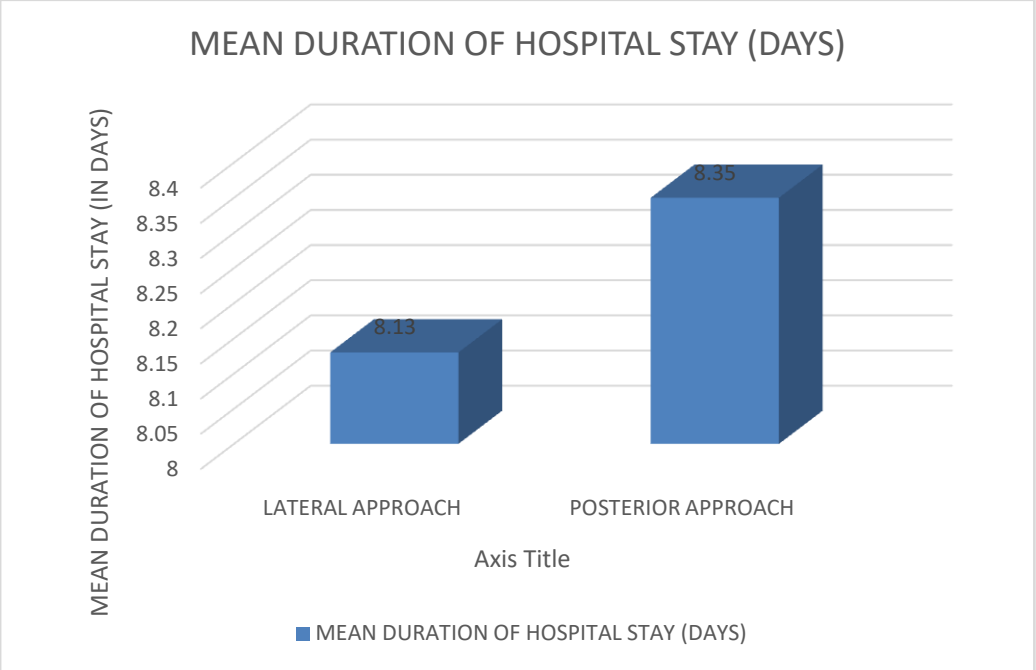


Mean intra-operative blood loss was 420.97 ml in patients operated with lateral approach, and 406.73 ml in patients operated with posterior approach.

TABLE 16. DURATION OF HOSPITAL STAY

	LATERAL APPROACH		POSTERIOR APPROACH		P-VALUE
	MEAN	SD	MEAN	SD	
DURATION OF HOSPITAL STAY (DAYS)	8.13	1.43	8.35	1.47	0.512

FIGURE 16. DURATION OF HOSPITAL STAY



The mean duration of hospital stay was 8.13 days in patients operated with lateral approach, and 8.35 days in patients operated with posterior approach.

TABLE 17A. MEAN HARRIS HIP SCORE AT FOLLOW-UP IN PATIENTS OPERATED WITH LATERAL AND POSTERIOR APPROACH

	LATERAL APPROACH		**POSTERIOR APPROACH**		**P-VALUE**
	MEAN	SD	MEAN	SD	
HHS (5 DAYS)	27.81	2.75	27.48	4.09	0.512
HHS (4 WEEKS)	41.32	4.89	42.92	5.20	0.170
HHS (8 WEEKS)	55.97	8.11	55.40	7.96	0.757
HHS (3 MONTHS)	66.13	7.76	67.65	7.27	0.370
HHS (6 MONTHS)	75.06	6.86	76.37	4.85	0.316

TABLE 17B. DIFFERENCE OF MEAN HARRIS HIP SCORE FROM THE PREVIOUS BASELINE VALUE AS OBSERVED DURING FOLLOWUP IN PATIENTS OPERATED WITH LATERAL AND POSTERIOR APPROACH

	LATERAL APPROACH		**POSTERIOR APPROACH**		**P-VALUE**
	MEAN	SD	MEAN	SD	
DIFF. HHS (4 WEEKS)	47.26	8.16	48.88	6.62	0.324
DIFF. HHS (8 WEEKS)	33.74	8.66	33.44	6.82	0.862
DIFF. HHS (3 MONTHS)	19.10	9.37	20.96	8.30	0.348
DIFF. HHS (6 MONTHS)	8.94	7.04	8.71	6.73	0.886

FIGURE 17A. MEAN HARRIS HIP SCORE AT FOLLOW-UP IN PATIENTS OPERATED WITH LATERAL AND POSTERIOR APPROACH

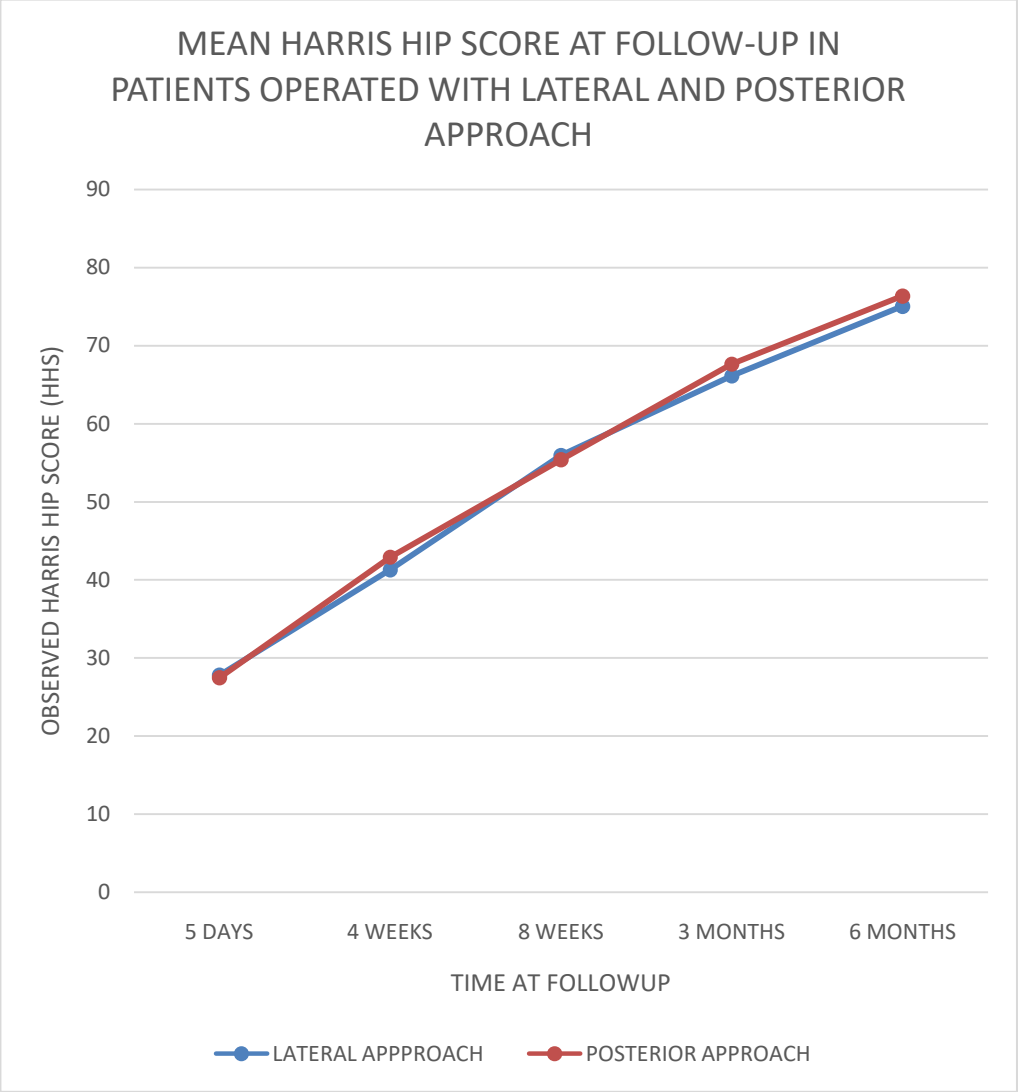


FIGURE 17B. DIFFERENCE OF MEAN HARRIS HIP SCORE FROM THE PREVIOUS BASELINE VALUE AS OBSERVED DURING FOLLOWUP IN PATIENTS OPERATED WITH LATERAL AND POSTERIOR APPROACH

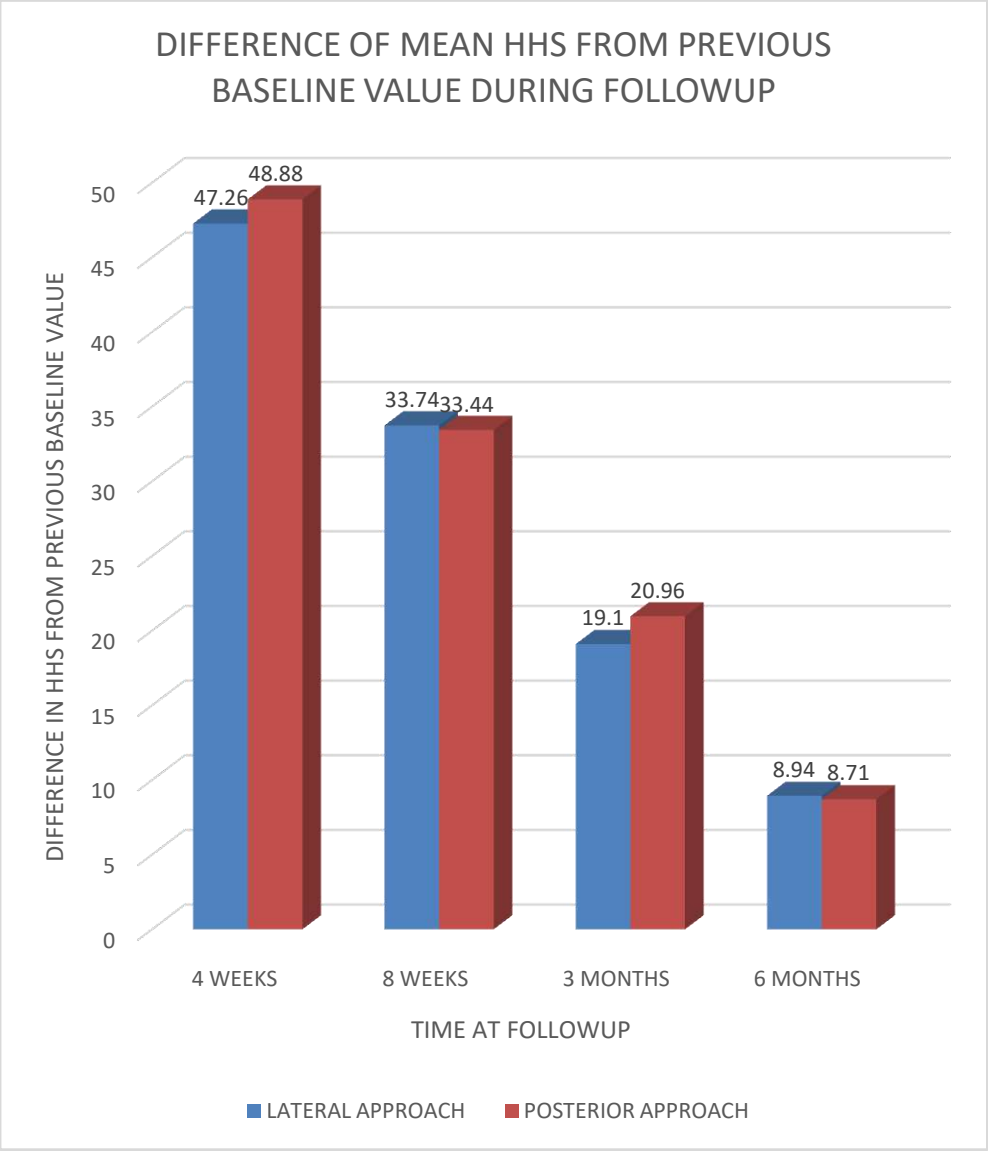
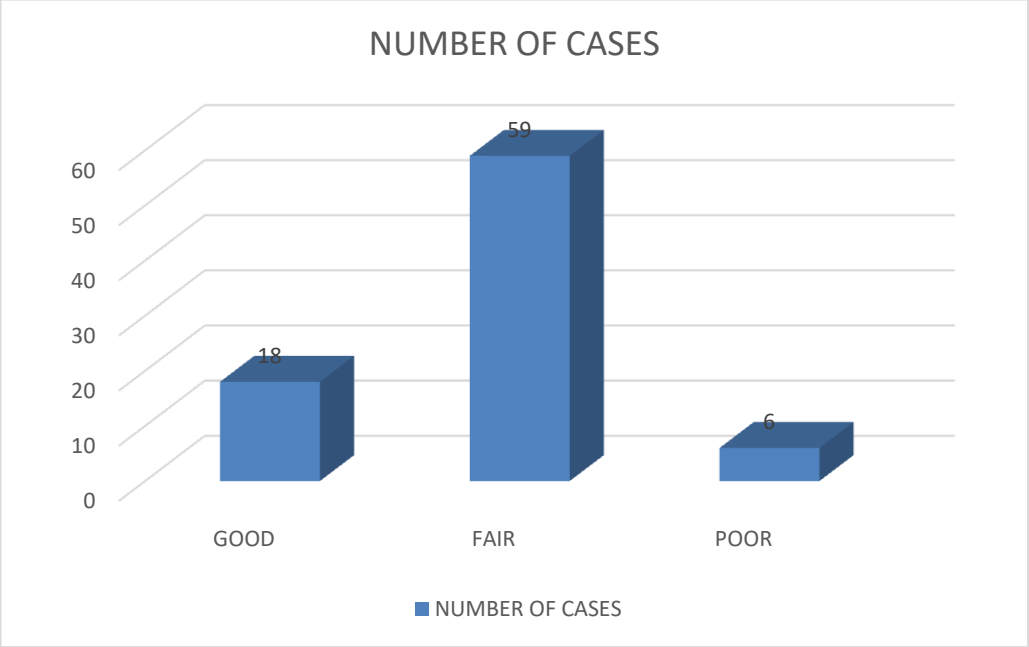


TABLE 18. FUNCTIONAL OUTCOME (BASED ON HARRIS HIP SCORE)

FUNCTIONAL OUTCOME	NUMBER OF CASES	PERCENTAGE
GOOD	18	21.68%
FAIR/REASONABLE	59	71.08%
POOR	6	7.22%
TOTAL	83	100%

FIGURE 18. FUNCTIONAL OUTCOME (BASED ON HARRIS HIP SCORE)

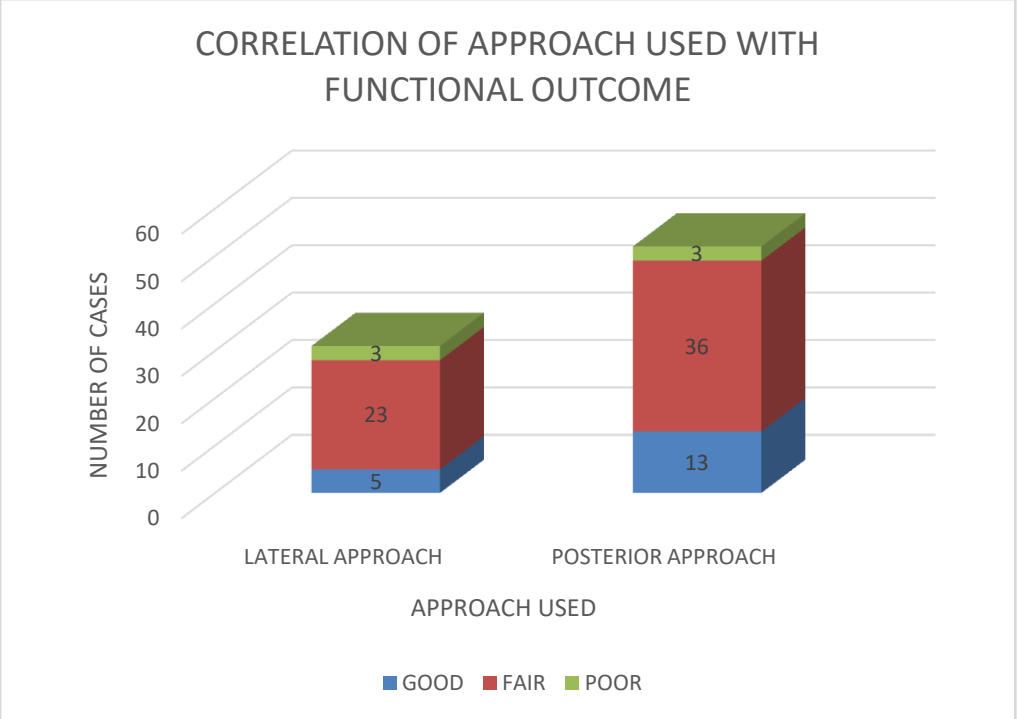


Of the total 83 patients, the functional outcome was observed to be good in 18 patients (21.68%), Fair in 59 patients (71.08%), and Poor in 6 patients (7.22%) based on the observed Harris Hip Score at conclusion of 6 months of follow-up.

TABLE 19. CORRELATION OF APPROACH USED WITH FUNCTIONAL OUTCOME

APPROACH USED	FUNCTIONAL OUTCOME						TOTAL	P VALUE
	GOOD		FAIR		POOR			
LATERAL	5	16.12%	23	74.19%	3	9.67%	31	0.554
POSTERIOR	13	25.0%	36	69.23%	3	5.77%	52	
TOTAL	18	21.68%	59	71.08%	6	7.22%	83	

FIGURE 19. CORRELATION OF APPROACH USED WITH FUNCTIONAL OUTCOME

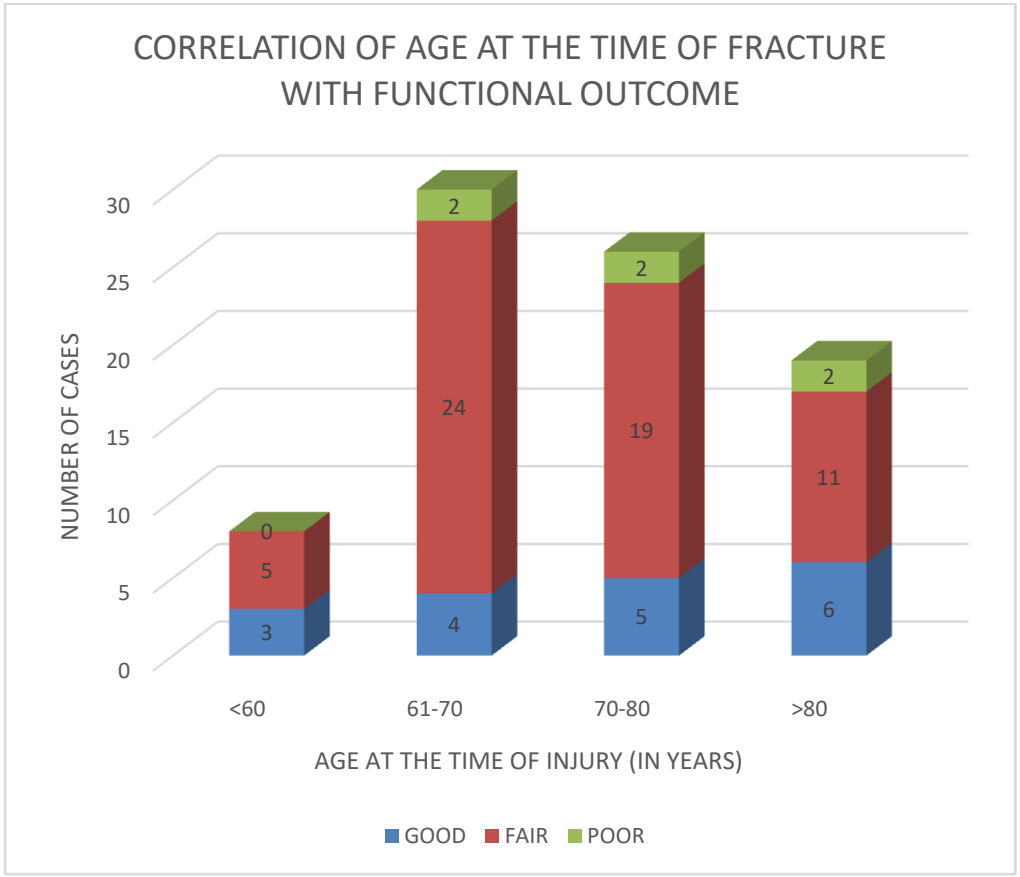


Out of the 31 patients operated with lateral approach, 5 patients (16.12%) showed Good functional outcome, 23 patients (74.19%) showed Fair and 3 patients (9.67%) showed Poor functional outcome. Among the 52 patients operated with posterior approach, 13 patients (25%) showed Good functional outcome, 36 patients (69.23%) showed Fair and 3 patients (5.77%) showed Poor functional outcome.

TABLE 20. CORRELATION OF AGE AT THE TIME OF FRACTURE WITH FUNCTIONAL OUTCOME

		FUNCTIONAL OUTCOME						TOTAL	P VALUE
		GOOD		FAIR		POOR			
AGE GROUP	<60	3	37.5%	5	62.5%	NIL	-	8	0.596
	61-70	4	13.33%	24	80%	2	6.66%	30	
	71-80	5	19.2%	19	73.77%	2	7.69%	26	
	>80	6	31.57%	11	57.87%	2	10.52%	19	
TOTAL		18	21.68%	59	71.08%	6	7.22%	83	

FIGURE 20. CORRELATION OF AGE AT THE TIME OF FRACTURE WITH FUNCTIONAL OUTCOME

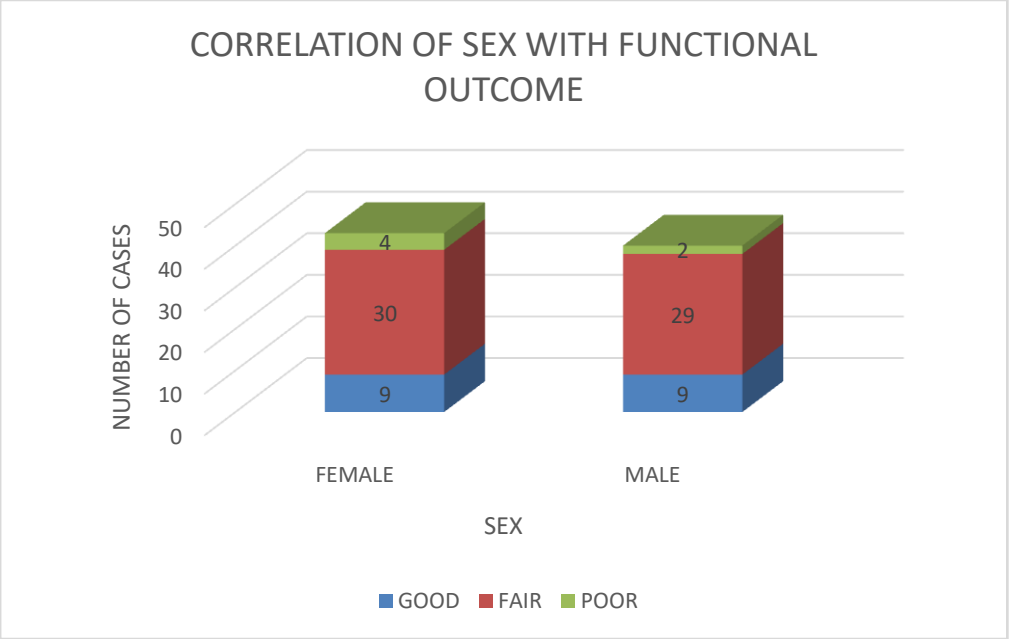


Among patients who belong to the <60 years age group, 37.5% had good functional outcome, and 62.5% patients had fair functional outcome. Hence, 100% patients had fair/reasonable to good functional outcome at the conclusion of 6 months of followup. While in the 61-70 years age group, 93.33% patients showed fair/reasonable to good functional outcome and 6.66% patients had poor functional outcome. in the 71-80 years age group, 92.97% patients showed fair/reasonable to good functional outcome and 7.69% patients had poor functional outcome. Among patients who were more than 80 years of age, 89.44% patients showed fair to good functional outcome while 10.52% patients had poor functional outcome.

TABLE 21. CORRELATION OF SEX WITH FUNCTIONAL OUTCOME

		FUNCTIONAL OUTCOME						TOTAL	P VALUE
		GOOD		FAIR		POOR			
SEX	FEMALE	9	20.93%	30	69.76%	4	9.3%	43	0.75
	MALE	9	22.50%	29	72.50%	2	5.0%	40	
TOTAL		18	21.68%	59	71.08%	6	7.22%	83	

FIGURE 21. CORRELATION OF SEX WITH FUNCTIONAL OUTCOME

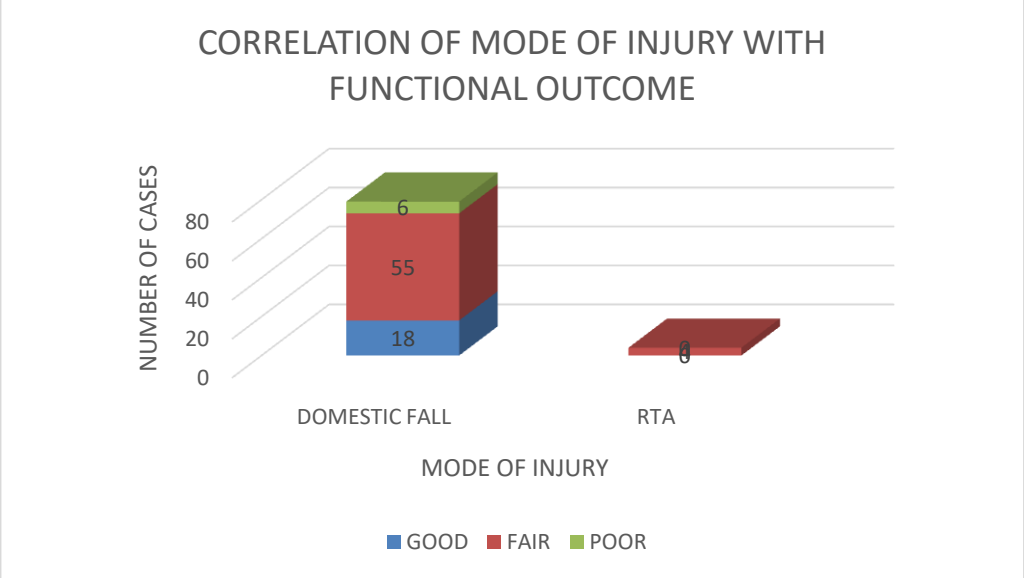


Out of the 43 female patients, 9 patients (20.93%) showed Good functional outcome, 30 patients (69.76%) showed Fair and 4 patients (9.3%) showed Poor functional outcome. Among the 40 male patients, 9 patients (22.50%) showed Good functional outcome, 29 patients (72.50%) showed Fair and 2 patients (5.0%) showed Poor functional outcome.

TABLE 22. CORRELATION OF MODE OF INJURY WITH FUNCTIONAL OUTCOME

	FUNCTIONAL OUTCOME						TOTAL	P VALUE
	GOOD		FAIR		POOR			
DOMESTIC FALL	18	22.78%	55	69.62%	6	7.59%	79	0.425
RTA	0	-	4	100%	0	-	4	
TOTAL	18	21.68%	59	71.08%	6	7.22%	83	

FIGURE 22. CORRELATION OF MODE OF INJURY WITH FUNCTIONAL OUTCOME

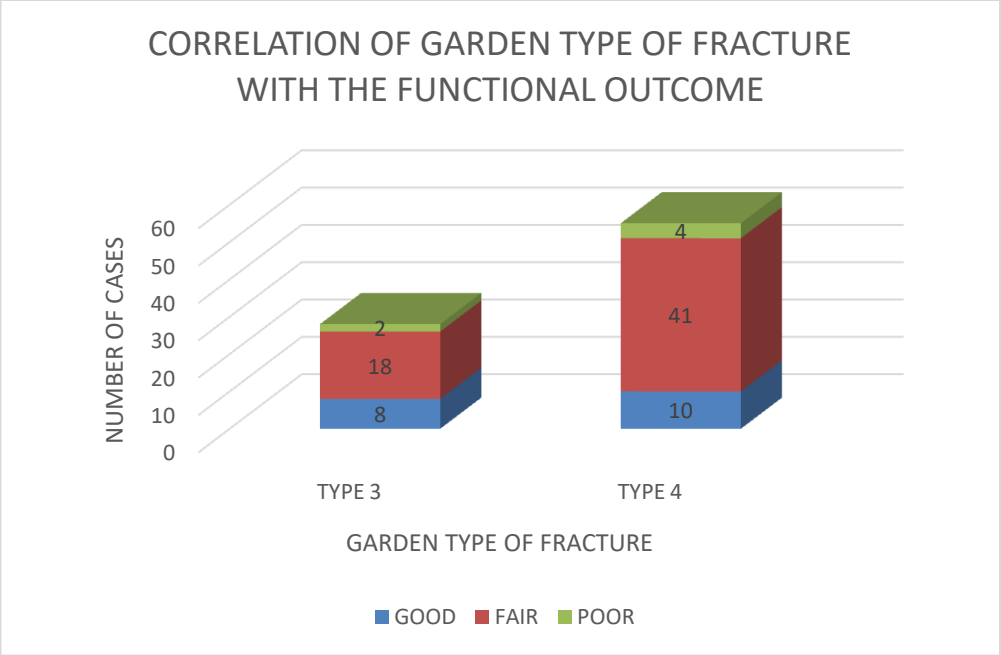


Of the 83 patients included in the study, 79 sustained fracture due to a domestic fall/fall on level ground. Of these 18 (22.78%) had good functional outcome, 55 (69.62%) had fair functional outcome and 6 (7.59%) patients showed poor functional outcome. Out of the 4 patients who sustained injury due to a road traffic accident, all 4 showed fair functional outcome.

TABLE 23. CORRELATION OF GARDEN TYPE OF FRACTURE WITH THE FUNCTIONAL OUTCOME

		FUNCTIONAL OUTCOME						TOTAL	P VALUE
		GOOD		FAIR		POOR			
GARDEN TYPE	III (3)	8	28.57%	18	64.28%	2	7.14%	28	0.549
	IV (4)	10	18.18%	41	74.54%	4	7.27%	55	
TOTAL		18	21.68%	59	71.08%	6	7.22%	83	

FIGURE 23. CORRELATION OF GARDEN TYPE OF FRACTURE WITH THE FUNCTIONAL OUTCOME

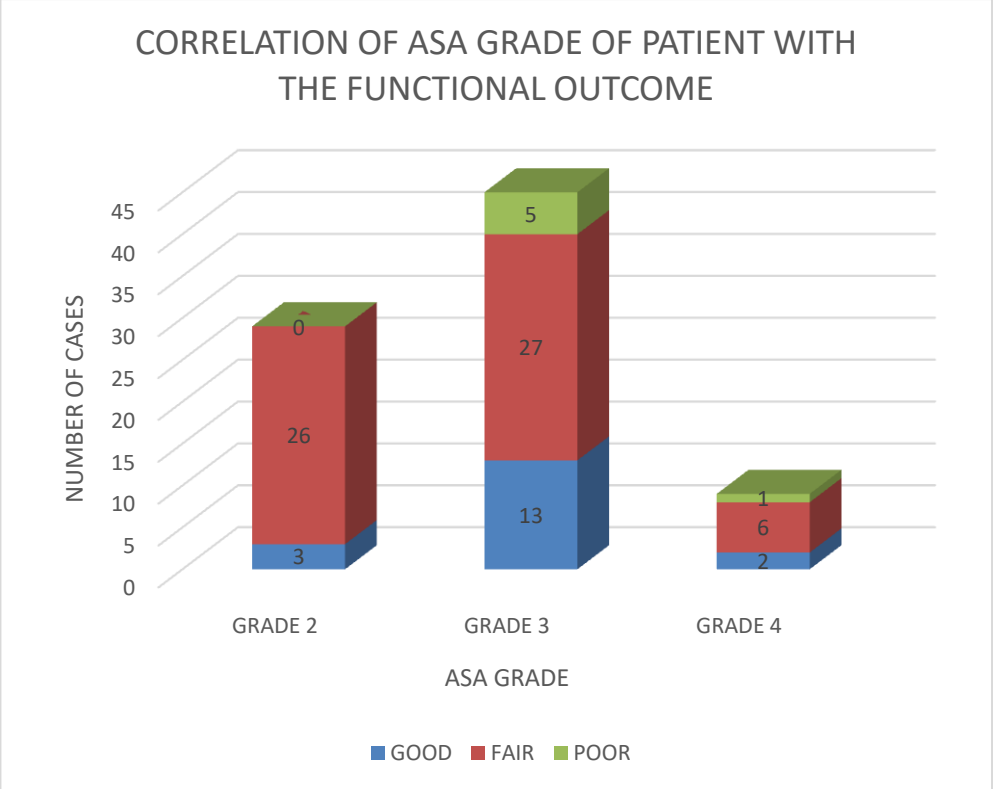


Of the 28 patients with Garden type 3 fracture, 8 patients (28.57%) showed Good functional outcome, 18 patients (64.28%) showed Fair and 2 patients (7.14%) showed Poor functional outcome. Among the 55 patients who had Garden type 4 fractures, 10 patients (18.18%) showed Good functional outcome, 41 patients (74.54%) showed Fair and 6 patients (7.22%) showed Poor functional outcome.

TABLE 24. CORRELATION OF ASA GRADE OF THE PATIENT WITH THE FUNCTIONAL OUTCOME

		FUNCTIONAL OUTCOME						TOTAL	P VALUE
		GOOD		FAIR		POOR			
ASA GRADE	2	3	10.34%	26	89.65%	0	-	29	0.084
	3	13	28.88%	27	60.0%	5	11.11%	45	
	4	2	22.22%	6	66.66%	1	11.11%	9	
TOTAL		18	21.68%	59	71.08%	6	7.22%	83	

FIGURE 24. CORRELATION OF ASA GRADE OF THE PATIENT WITH THE FUNCTIONAL OUTCOME

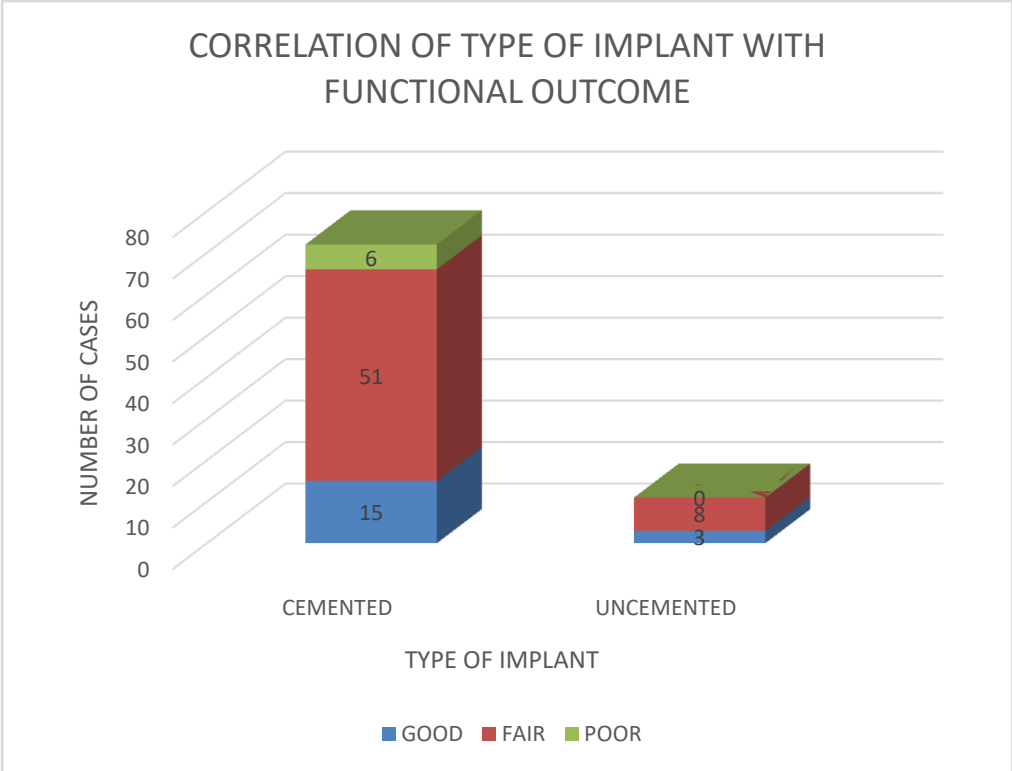


Of the 29 patients with ASA grade 2, 3 patients (10.34%) had good functional outcome, and 26 patients showed (89.65%) reasonable functional outcome. Of the 45 patients with ASA grade 3, 13 patients (28.88%) had good functional outcome, 27 (60%) patients had fair functional outcome, and 5 (11.11%) patients had poor functional outcome. Of the 9 patients with ASA grade 4, 2 patients (22.22%) had good functional outcome, 6 patients (66.66%) had fair functional outcome, and 1 patient (11.11%) had poor functional outcome.

TABLE 25. CORRELATION OF THE TYPE OF IMPLANT USED WITH FUNCTIONAL OUTCOME

	FUNCTIONAL OUTCOME						TOTAL	P VALUE
	GOOD		FAIR		POOR			
CEMENTED	15	20.83%	51	70.83%	6	8.33%	72	0.576
UNCEMENTED	3	27.27%	8	72.72%	0	-	11	
TOTAL	18	21.68%	59	71.08%	6	7.22%	83	

FIGURE 25. CORRELATION OF THE TYPE OF IMPLANT USED WITH FUNCTIONAL OUTCOME

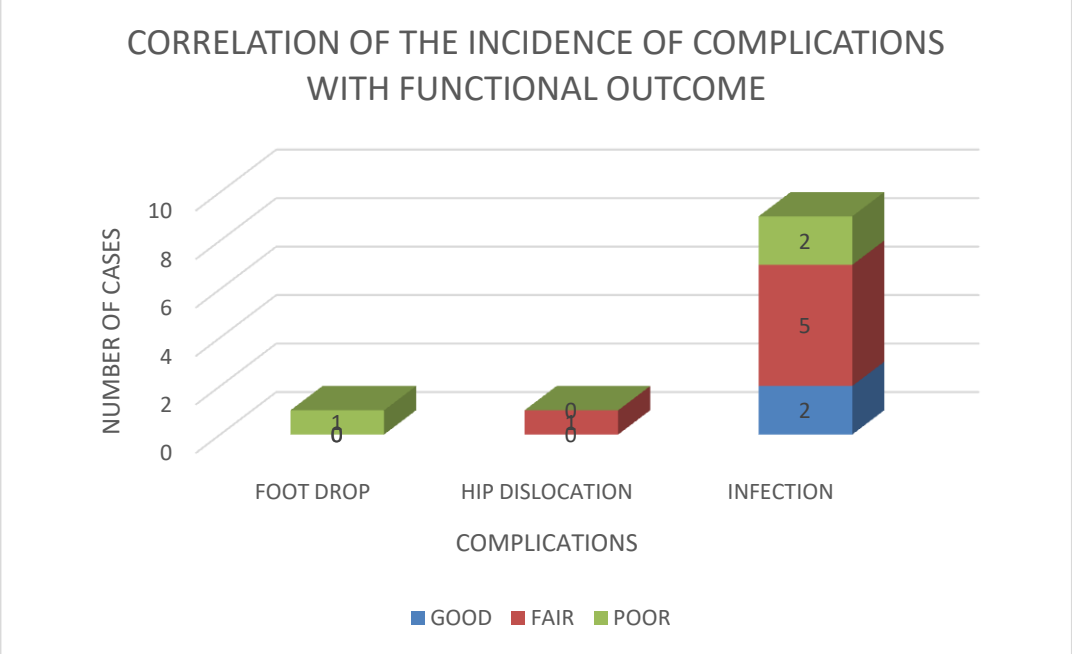


Of the 72 patients in whom cemented implant was used, 15 patients (20.03%) had good functional outcome, 51 patients (70.83%) had fair functional outcome, and 6 (8.33%) had poor functional outcome. Of the 11 patients in whom cemented implant was used, 3 patients (27.27%) had good functional outcome and 8 patients (72.72%) had fair functional outcome.

TABLE 26. CORRELATION OF THE INCIDENCE OF COMPLICATIONS WITH FUNCTIONAL OUTCOME

		FUNCTIONAL OUTCOME						TOTAL	P VALUE
		GOOD		FAIR		POOR			
COMPLICATIONS	FOOT DROP	0	-	0	-	1	100%	1	**0.008**
	DISLOCATION	0	-	1	100%	0	-	1	
	INFECTION	2	22.22%	5	55.55%	2	22.22 %	9	
	NIL	16	22.22%	53	73.61%	3	4.1%	72	
TOTAL		18	21.68%	59	71.08%	6	7.22%	83	

FIGURE 26. CORRELATION OF THE INCIDENCE OF COMPLICATIONS WITH FUNCTIONAL OUTCOME



One patient (100%) who had incidence of foot drop had poor functional outcome. One patient (100%) who had incidence of hip dislocation had fair functional outcome according to the HHS observed at conclusion of 6 months of follow-up. Among patients who had incidence of infection, 7 patients (77.77%) had fair to good functional outcome, and 2 patients (22.22%) had poor functional outcome. In patients who had no incidence of complications, 69 patients (95.83%) had good to fair functional outcome, and only 3 patients (4.1%) had poor functional outcome.

DISCUSSION

Patients suffering from a hip fracture, especially elderly patients, are at a high risk of death, health complications, and reduced quality of life. Despite the high frequency of the injury, especially among the elderly, the way in which surgical management of displaced femoral neck fractures in elderly patients needs to be done remains uncertain. [77] Options include hemiarthroplasty, which involves replacing the femoral head with prosthesis, or total hip arthroplasty, which involves replacement of both the femoral head and the acetabulum with prostheses. [78]

Hemiarthroplasty requires different considerations than total hip arthroplasty. In the latter, clear exposure of both the femur and the acetabulum is required, necessitating a relatively extensive exposure. Because patients are generally older and more vulnerable to anaesthetics and surgical procedures, hemiarthroplasty requires a quick but effective operation with the least amount of trauma and physiological upset. Many surgical approaches to the hip have been described. [79]

The aim of the present study was to compare between the functional outcome in patients operated for Hemiarthroplasty with the lateral and posterior approaches.

It was a prospective study carried on patients admitted in department of Orthopaedics, Dayanand Medical College and Hospital, Ludhiana. In the current study we enrolled 92 patients who had sustained a fracture neck of the femur and were operated for Hemiarthroplasty of the Hip. The patients were then followed up on and after attrition a total of 83 patients were analysed in accordance with the study protocol.

Out of 83, 43 (51.80%) were female and 40 (48.19%) were male patients. The age of the patients ranged from 43 to 99 years, with the average age being 72.49 years. The study by Prasad et al [64] had 80 patients out of which 32 were males and 48 were females with age

ranging between 50 to 80 years of age and with a mean age of 64.30 years for the lateral approach group and 65.85 years for the posterior approach group. Hongisto et al [70] included 393 patients with fragility femoral neck fracture, who were aged 65 years or more with a mean of 82.8 years of age. Parker et al [71] performed their study on 216 patients who had undergone a cemented Hemiarthroplasty. The patients were aged between 61 and 100 years and the mean age was 84.3 years for lateral approach and 83.6 years for posterior approach. Higher incidence of fractures of neck of femur among elderly patients is attributable to lower BMD, thinning of supero-lateral femur neck cortex, [80] and comparatively increasing risk of fall.

Of the 83 patients included in the study, 79 patients (95.18%) had sustained the injury due to fall on level ground, and only 4 (4.81%) reported the injury due to a road traffic accident, thereby confirming fall as the major etiology for fracture of neck of femur in the elderly, due to bothincreasedskeletalfragilityandanincreasedtendencytofallwithage. [81,82,83]

Outcomes

Gender of the patient was found to be having no bearing on the final functional outcome (p-value = 0.75), and occurrence of good functional outcomes were in the same range in both groups.

There was a trend of more incidence of poorer outcomes with increasing age of the patients, although the difference was still statistically insignificant (p value = 0.596).

There was no significant difference in the outcomes when correlated with the degree of displacement of the fracture based on the Garden type. The occurrence of Fair to good, and poor functional outcomes was similar whether the fracture was Garden type 3 or Garden type 4 (p-value= 0.549)

Patients with better ASA grades to start with understandably had better occurrence of fair to good functional outcomes, no patient with an ASA

grade of 2 had a poor functional outcome at final followup. Patients with an ASA grade 3 had more percentage of good functional outcomes as compared with those with ASA grade 4 at final followup. The difference was observed to be approaching statistical significance. (p value = 0.084)

Patients in whom there was incidence of complications (infection, foot drop, dislocation etc.) during the course of our follow-up, functional outcome was poorer compared to those in whom no complication was seen. The difference was statistically quite significant (p-value = 0.008) and could be attributable to guarded weight bearing and a general decline in well-being of the patient owing to the said complications.

In view of the main aim of our study to assess the functional outcome of the patients operated with Hemiarthroplasty and to compare between the lateral and posterior approaches, we periodically noted the Harris Hip scores of the patients at <5 days after the surgery, and then at 4 weeks, 8 weeks, 3 months and 6 months. We categorised the patients based on their HHS obtained at the final follow-up at 6 months as Excellent (HHS >90), Good (HHS 80-89), Reasonable/Fair (HHS 70-79) and Poor (HHS <70). In lateral approach group outcome was good in 16.12% and overall functional outcome was fair to good in 90.32% patients. In posterior approach group outcome was good in 25% patients and overall functional outcome was fair to good in 94.23% patients.

Although the functional outcome was found to be slightly better in patients operated with posterior approach, it was statistically insignificant (p-value = 0.554). We also calculated the difference of the observed value of HHS from the previous baseline value and compared between the two groups, the difference between the two groups was found to be statistically insignificant as well. (p-values were 0.324, 0.862, 0.384, 0.886 at 4 weeks, 8 weeks, 3 months and 6 months respectively)

Prasad et al [64] compared the two groups based on HHS noted at 3 months, 6 months and 1 year and found only a marginal difference between the two groups but it was insignificant and within the limits of error (p-value at final follow-up was 0.094).

In Hongisto et al's study, [70] both groups were compared on the basis of level of mobility 1 year after the procedure, and although the patients operated with the lateral approach fared better than the posterior approach group, the difference was statistically insignificant (p-value = 0.406).

Parker et al [71] found no notable differences between the two groups in terms of mean mobility scores noted at 2, 3, 6, 9 months and 1 year of post-operative follow-up (p-values >/= 0.4)

The intra-operative blood loss was found to be slightly less in patients operated with posterior approach but the difference was insignificant (p-value = 0.386). Similarly, duration of surgery was lesser in posterior approach group, but the difference was slightly insignificant. (p-value = 0.822). Parker et al (71) observed that number of patients who required transfusion post-operatively as well as mean units of blood transfused were statistically similar in both posterior and lateral approaches. (P-value = 0.3). Similarly, no significant differences were detected between the two groups for the need for blood transfusion by Hongisto et al (70) and Prasad et al. [64]

Earlier studies have suggested no significant difference between approaches when it comes to overall incidence of complications, but also that posterior approach carries a higher risk of dislocation.(82) In our study, although the incidence of infection was more in lateral approach (12.9% versus 9.6%), the only cases of foot drop and hip dislocation were observed in the posterior approach group. The p-value (0.709) calculated for difference between both groups for the overall incidence on complications was which was statistically insignificant.

Parker et al [71] compared the two approaches for the incidence of deep and superficial wound infection, foot drop, dislocation as well as the need for revision surgery and for all of these parameters the difference was found to be insignificant. De Vries et al [72] observed although more dislocations were reported with posterior approach, statistical significance was not achieved. (p value = 0.11)

The main aim of Biber et al [65] was to study the incidence of complications between the two approaches, and they found that although there was no significant difference in the overall incidence of early surgical complications between the two approaches, dislocation was the most common complication after the posterior approach.

Ozan et al (2016), found no statistically significant difference in incidence of dislocation, infections and mortality between the two groups.(80) However, Hongisto et al [70] noted that the incidence of dislocations in the posterior approach was significant (p-value = 0.036) when compared with the lateral approach.

The duration of hospital stay was comparatively lesser in patients operated with lateral approach (mean 8.13 days) than posterior approach group (mean 8.35 days). The difference was statistically insignificant (p-value = 0.512). Parker et al (71) compared the length of the hospital stay and the difference between the two approaches was found to be clinically insignificant (mean difference 1.8 days, p-value =0.40)

Barring a few studies to the contrary, existing literature is largely of the consensus that patients undergoing cemented hemiarthroplasty have improved short-term patient reported outcomes and lower peri-prosthetic fracture risk, but at the expense of increased surgical time and blood loss.

In our study we noted slightly better functional outcome rate in patients who had uncemented HA, but below the level of significance (p-value = 0.576). This could be attributable to the overwhelming use of cemented implants in the patients included in the study (86.74% cemented,

13.25% uncemented), which is a limitation of our study in assessing the difference between the two groups.

Similar to our study, a high quality study by Figved et al on 220 patients showed that mean HHS was marginally better in the uncemented group, and the mean surgery time and mean intra-operative blood loss was also less. The rates of complications and mortality were similar between the two groups. [83]

Taylor et al observed that implant-related complication rates were significantly lower in the cemented implant group, as well as improved function and mobility. These trends became significant in specific functional scores at various postoperative time points. [84]

SUMMARY AND CONCLUSION

The present study was a prospective study conducted at the Department of Orthopedics, Dayanand Medical College & Hospital, Ludhiana aimed at assessing the functional outcome and incidence of complications in patients operated for Hemiarthroplasty with the lateral or posterior approach.

From among our observations from the study, the salient results are:

- A total of 83 patients were analysed at the final follow-up, and the majority of the study population was elderly with 90.36% of the patients aged 60 years or above.
- 43 patients (51.80%) were female, and 40 patients (48.19%) were male.
- 32 patients were operated using the lateral approach and 52 patients were operated with the posterior approach.
- The mean age of patients operated with lateral approach was 70.74 years (SD 10.51), and of patients operated with posterior approach was 73.54 years (SD 10.25).
- Domestic fall or fall on level ground was the mode of injury in an overwhelming number of patients (79 patients; 95.18% of the total patients)
- Fractures of 28 patients (33.73%) belonged to Garden type 3 and fractures of 55 patients (66.26%) belonged to Garden type 4.
- Patients who had better initial ASA grades had better functional outcomes, and this difference was observed to be approaching statistical significance.
- Cemented bipolar implants were used in 72 patients (86.74%), while uncemented bipolar implants were used in 11 patients (13.25%).
- Group of patients with the incidence of any complication had statistically significant poorer functional outcomes compared

with patients in whom no complication was observed during the course of our followup.

- Posterior approach was found to be marginally better than lateral approach in terms of intra-operative blood loss, operating time, start of weight bearing (with and without support), HHS as periodically noted during the followup, and functional outcome at the final followup, but the difference was not statistically significant.
- Lateral approach was found to be slightly better than posterior approach in terms of duration of hospital stay, but the difference was not statistically significant.
- There was no statistically significant difference for the incidence of complications between the two approaches. The only cases of foot drop and hip dislocation were seen in patients operated with the posterior approach.
- Functional outcome was slightly better among patients in whom uncemented implant was used, but the difference was not statistically significant.
- It is recommended that in the absence of evidence to suggest clear superiority of one approach over the other, the choice of approach for Hemiarthroplasty should be guided by the preference of the surgeon, and their experience and familiarity with the procedure.

Conclusion

The current study found no statistically significant differences in functional outcomes or complications between the two approaches. Neither the lateral nor the posterior approaches appear to provide a clear advantage in terms of functional outcome or post-operative complications. As a result, a recommendation for a specific surgical approach should be an expert opinion based on surgeon preference and experience, rather than based on empirical data alone.

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Case number 1: Patient with good functional outcome

Serial number 9

Age/Sex: 63 year's old, female

Mode of injury: Sustained fracture of right side neck of Femur due to a fall on level ground

Approach used: Posterior

Implant type: Cemented

Duration of surgery: 115 minutes

Intra-operative blood loss: 500 ml

Final outcome: Good

PICTURE 6: PRE-OPERATIVE PBH AP VIEW

PICTURE 7: PRE-OPERATIVE AP AND LATERAL VIEW OF HIP WITH THIGH

PICTURE 8: POST-OPERATIVE AP VIEW OF HIP WITH THIGH AT 1 DAY AFTER SURGERY

PICTURE 9: ASSESSMENT OF FUNCTIONAL OUTCOME AND RANGE OF MOTION AT FINAL FOLLOW-UP

Case number 2: Patient with good functional outcome

Serial number 42

Age/Sex: 69 years old, female

Mode of injury: Sustained fracture of left side neck of Femur due to a fall on level ground

Approach used: Posterior

Implant type: Cemented

Duration of surgery: 135 minutes

Intra-operative blood loss: 400 ml

Final outcome: Good

PICTURE 10: PRE-OPERATIVE APVIEW OF HIP WITH THIGH

PICTURE 11: POST-OPERATIVE AP VIEW OF HIP WITH THIGH AT 1 DAY AFTER SURGERY

PICTURE 12: POST-OPERATIVE X-RAY OF HIP WITH THIGH AT 6 MONTHS AFTER SURGERY

PICTURE 13: ASSESSMENT OF FUNCTIONAL OUTCOME AND RANGE OF MOTION AT FINAL FOLLOW-UP

Case number 3: Patient with good functional outcome

Serial number16

Age/Sex: 71 year's old, female

Mode of injury: Sustained fracture of left side neck of Femur due to a fall on level ground

Approach used: Posterior

Implant type: Cemented

Duration of surgery: 110 minutes

Intra-operative blood loss: 500 ml

Final outcome: Good

PICTURE 14: PRE-OPERATIVE PBH AP VIEW

PICTURE 15: POST-OPERATIVE AP VIEW OF HIP WITH THIGH AT 2 DAYS POST-SURGERY

PICTURE 16: POST-OPERATIVE AP VIEW OF HIP WITH THIGH AT 6 MONTHS POST-SURGERY

PICTURE 17: ASSESSMENT OF FUNCTIONAL OUTCOME AND RANGE OF MOTION AT FINAL FOLLOW-UP

Case number 5: Patient with good functional outcome

Serial number 46

Age/Sex: 80 year's old, male

Mode of injury: Sustained fracture of left side neck of Femur due to a fall on level ground

Approach used: Posterior

Implant type: Cemented

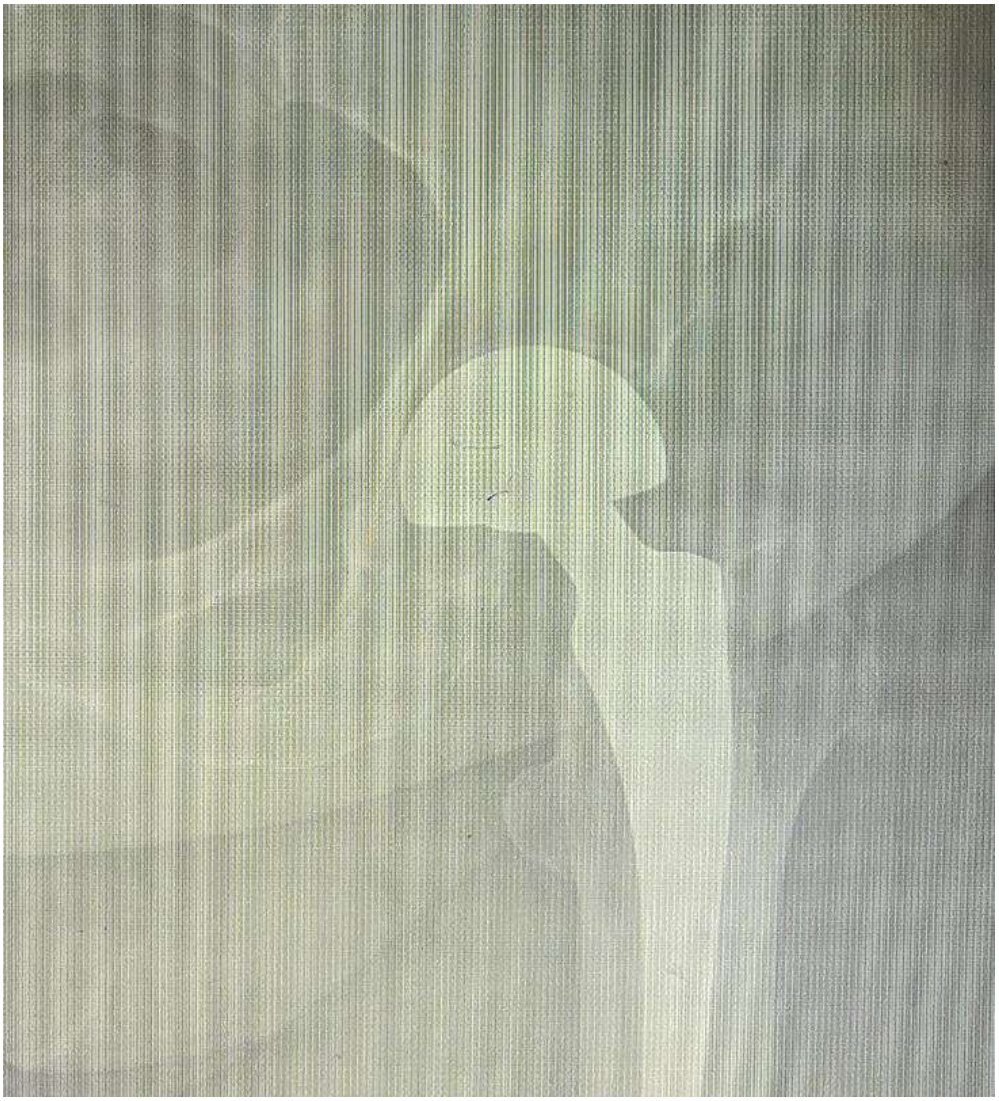
Duration of surgery: 110 minutes

Intra-operative blood loss: 300 ml

Final outcome: Good

PICTURE 18: PRE-OPERATIVE AP VIEW OF HIP WITH THIGH

PICTURE 19: POST-OPERATIVE AP VIEW OF HIP WITH THIGH AT 1 DAY POST-SURGERY



PICTURE 20: POST-OPERATIVE AP VIEW OF HIP WITH THIGH AT 5 MONTHS POST-SURGERY

PICTURE 21: ASSESSMENT OF FUNCTIONAL OUTCOME AND RANGE OF MOTION AT FINAL FOLLOW-UP

Case number 6: Patient with good functional outcome

Serial number 1

Age/Sex: 82 year's old, male

Mode of injury: Sustained fracture of right side neck of Femur due to a fall on level ground

Approach used: Lateral

Implant type: Cemented

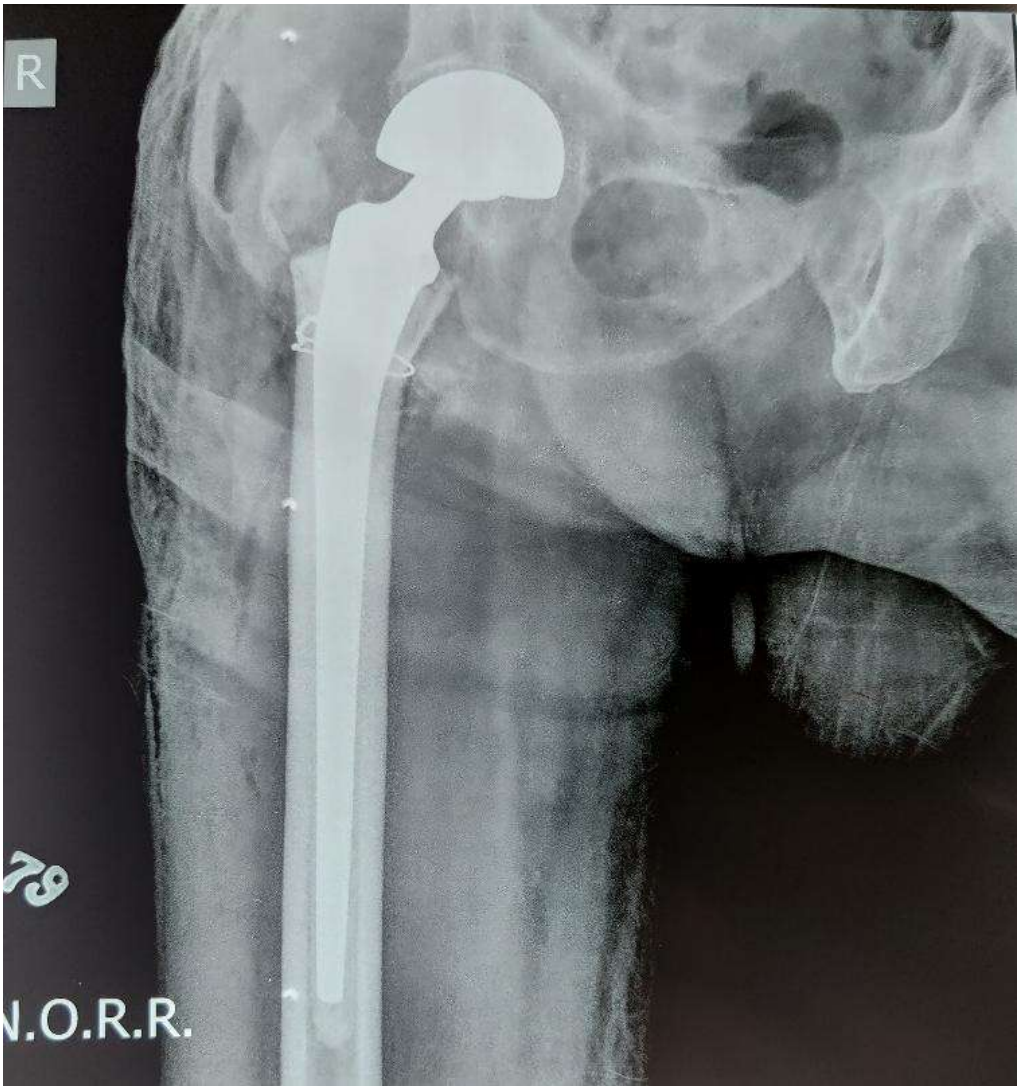
Duration of surgery: 120 minutes

Intra-operative blood loss: 500 ml

Final outcome: Good

PICTURE 22: PRE-OPERATIVE PBH AP VIEW

PICTURE 23: PRE-OPERATIVE AP AND LATERAL VIEW OF HIP WITH THIGH



PICTURE 24: POST-OPERATIVE AP VIEW OF HIP WITH THIGH AT 2 DAYS AFTER SURGERY

PICTURE 25: POST-OPERATIVE AP VIEW OF HIP WITH THIGH AT 6 MOTNHS AFTER SURGERY

PICTURE 26: ASSESSMENT OF FUNCTIONAL OUTCOME AND RANGE OF MOTION AT FINAL FOLLOW-UP

PROFORMA

S. NO:

AGE: SEX:

NAME: ADMISSION NO:

MRD NO:

DATE OF ADMISSION: DATE OF DISCHARGE:

RELIGION: OCCUPATION:

DATE OF INJURY:

MODE OF INJURY: ROAD SIDE ACCIDENT/DOMESTIC FALL/OTHER

EMPLOYMENT STATUS: EMPLOYED/DEPENDENT

ASA GRADE: I / II / III/ IV / V /VI

CO-MORBIDITIES (if any): DIABETES MELLITUS TYPE 2, HYPERTENSION, HYPOTHYROIDISM, Other:

LOCAL EXAMINATION:

OPEN/CLOSED FRACTURE:

GRADE OF FRACTURE:

SKIN CONDITION :

X RAY FINDINGS:

FRACTURE CLASSIFICATION: GARDEN CLASSIFICATION TYPE I/ TYPE II/ TYPE III/ TYPE IV

SITE OF FRACTURE:

DISPLACED/UNDISPLACED FRACTURE:

DATE OF SURGERY:

TIME LAG BETWEEN DATE OF INJURY AND DATE OF SURGERY (DAYS):

Signature of Candidate **Signature of Supervisor**

OPERATION/PROCEDURE DONE:

APPROACH USED: POSTERIOR/LATERAL/OTHER

IMPLANT USED: CEMENTED/UNCEMENTED
DURATION OF SURGERY:

BLOOD LOSS-

ANAESTHESIA USED: GENERAL ANAESTHESIA/SPINAL

ANAESTHESIA/COMBINED SPINAL EPIDURAL ANAESTHESIA

POSTOPERATIVE LIMB LENGTH DISCREPANCY (LLD):

DURATION OF HOSPITAL STAY-

START OF FULL WEIGHT BEARING WALKING

- WITH SUPPORT (DATE):
    - DAYS FROM THE DAY OF SURGERY:
- WITHOUT SUPPORT (DATE):
    - DAYS FROM THE DAY OF SURGERY:

FUNCTIONAL OUTCOME ASSESSED BY:

(1) HARRIS HIP SCORE :

- PAIN (CHECK ONE)
    - NONE OR IGNORES IT (44)
    - SLIGHT, OCCASIONAL, NO COMPROMISE IN ACTIVITIES (40)
    - MILD PAIN, NO EFFECT ON AVERAGE ACTIVITIES, RARELY MODERATE PAIN WITH UNUSUAL ACTIVITY; MAY TAKE ASPIRIN (30)
    - MODERATE PAIN, TOLERABLE BUT MAKES CONCESSION TO PAIN.
    - OCCASIONAL PAIN MEDICATION STRONGER THAN ASPIRIN (20)
    - MARKED PAIN, SERIOUS LIMITATION OF ACTIVITIES (10
    - TOTALLY DISABLED, CRIPPLED, PAIN IN BED, BEDRIDDEN (0)
- LIMP
    - NONE (11)
    - SLIGHT (8)
    - MODERATE (5)
    - SEVERE (0)
- SUPPORT

Signature of Candidate **Signature of Supervisor**

- NONE (11)
- CANE FOR LONG WALKS (7)
- CANE MOST OF TIME (5)
- ONE CRUTCH (3)
- TWO CANES (2)
- TWO CRUTCHES OR NOT ABLE TO WALK (0)

- DISTANCE WALKED

  - UNLIMITED (11)
  - SIX BLOCKS (8)
  - TWO OR THREE BLOCKS (5)
  - INDOORS ONLY (2)
  - BED AND CHAIR ONLY (0)

- SITTING

  - COMFORTABLY IN ORDINARY CHAIR FOR ONE HOUR (5)
  - ON A HIGH CHAIR FOR 30 MINUTES (3)
  - UNABLE TO SIT COMFORTABLY IN ANY CHAIR (0)

- ENTER PUBLIC TRANSPORTATION

  - YES (1)
  - NO (0)

- STAIRS

  - NORMALLY WITHOUT USING A RAILING (4)
  - NORMALLY USING A RAILING (2)
  - UNABLE TO DO STAIRS (0)

- PUT ON SHOES AND SOCKS

  - WITH EASE (4)
  - WITH DIFFICULTY (2)
  - UNABLE (0)

- ABSENCE OF DEFORMITY (ALL YES = 4; LESS THAN 4 =0)

  - LESS THAN 30° FIXED FLEXION CONTRACTURE: YES/NO
  - LESS THAN 10° FIXED ABDUCTION: YES/NO
  - LESS THAN 10° FIXED INTERNAL ROTATION IN EXTENSION:YES/NO
  - LIMB LENGTH DISCREPANCY LESS THAN 3.2 CM: YES/NO

- RANGE OF MOTION (*INDICATES NORMAL)

  - FLEXION (*140°) _____
  - ABDUCTION (*40°) _____
  - ADDUCTION (*40°) _____
  - EXTERNAL ROTATION (*40°) _____
  - INTERNAL ROTATION (*40°) _____

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- RANGE OF MOTION SCALE

  - 211° - 300° (5)
  - 161° - 210° (4)
  - 101° - 160° (3)
  - 61° - 100 (2)
  - 31° - 60° (1)
  - 0° - 30° (0)

RANGE OF MOTION SCORE _____
TOTAL HARRIS HIP SCORE _____

POSTOPERATIVE:
AT 4 WEEKS:
AT 8 WEEKS:
AT 3 MONTHS:
AT 6 MONTHS:

(2) INCIDENCE OF COMPLICATION(s):

- PERIPROSTHETIC FRACTURE
  - DATE OF INCIDENCE:
  - TIME LAG BETWEEN SURGERY AND INCIDENCE:
  - WHETHER RE-OPERATED: YES/NO

- HIP DISLOCATION
  - DATE OF INCIDENCE:
  - TIME LAG BETWEEN SURGERY AND INCIDENCE:
  - WHETHER RE-OPERATED: YES/NO

- INFECTION
  - DATE OF INCIDENCE:
  - TIME LAG BETWEEN SURGERY AND INCIDENCE:
  - WHETHER RE-OPERATED: YES/NO

- ASPETIC LOOSENING
  - DATE OF INCIDENCE:

Signature of Candidate **Signature of Supervisor**

- TIME LAG BETWEEN SURGERY AND INCIDENCE:
- WHETHER RE-OPERATED: YES/NO

- OTHER
  - DATE OF INCIDENCE:
  - TIME LAG BETWEEN SURGERY AND INCIDENCE:
  - WHETHER RE-OPERATED: YES/NO

Signature of Candidate **Signature of Supervisor**

S.no	MRD	Name	Age	Sex	Mode of injury	Employment Status	Occupation	ASA Grade	Co-morbidities	Garden type	Displaced/Undisplaced	Time lag between injury and surgery (days)	Approach	Implant used	Duration of Surgery (minutes)
1	1009805	AS	82	MALE	DOMESTIC FALL	DEPENDENT	NIL	3	CAD	4	DISPLACED	2	Lateral	CEMENTED	120
2	1015547	RB	76	MALE	DOMESTIC FALL	DEPENDENT	NIL	3	HTN	4	DISPLACED	1	Posterior	CEMENTED	135
3	1019799	RDM	99	MALE	DOMESTIC FALL	DEPENDENT	NIL	3	ILD	3	DISPLACED	5	Posterior	CEMENTED	120
4	1023542	MB	90	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	3	CAD, HTN	3	DISPLACED	2	Posterior	CEMENTED	120
5	1024788	LD	75	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	4	CAD, HTN	4	DISPLACED	5	Posterior	CEMENTED	105
6	44460	AK	69	MALE	DOMESTIC FALL	EMPLOYED	BUSINESS	3	CAD, CKD, HTN	3	DISPLACED	2	Posterior	CEMENTED	110
7	886795	SB	73	MALE	DOMESTIC FALL	DEPENDENT	NIL	2	NIL	4	DISPLACED	3	Posterior	CEMENTED	105
8	1029145	SL	57	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	3	CAD	4	DISPLACED	1	Posterior	UNCEMENTED	140
9	896223	GK	63	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	3	DM, CLD	4	DISPLACED	12	Posterior	CEMENTED	115
10	1032978	RK	90	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	2	NIL	3	DISPLACED	2	Posterior	CEMENTED	100
11	1032111	BDG	82	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	3	HYPERTHYROIDISM	4	DISPLACED	8	Lateral	CEMENTED	120
12	381083	TS	86	MALE	DOMESTIC FALL	DEPENDENT	NIL	3	CAD	4	DISPLACED	3	Posterior	CEMENTED	100
13	1037497	KD	68	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	2	NIL	4	DISPLACED	1	Posterior	CEMENTED	135
14	1033176	SD	43	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	3	NIL	4	DISPLACED	2	Lateral	UNCEMENTED	120
15	1038655	S	73	MALE	DOMESTIC FALL	DEPENDENT	NIL	2	NIL	3	DISPLACED	5	Lateral	UNCEMENTED	130
16	725096	MK	71	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	3	DM, HTN	4	DISPLACED	7	Posterior	CEMENTED	110
17	1049753	RS	84	MALE	DOMESTIC FALL	DEPENDENT	NIL	3	HTN	3	DISPLACED	10	Lateral	CEMENTED	105
18	297996	GS	73	MALE	DOMESTIC FALL	DEPENDENT	NIL	4	DM, HTN, CAD	4	DISPLACED	2	Lateral	CEMENTED	130
19	1061448	KK	77	MALE	DOMESTIC FALL	DEPENDENT	NIL	2	NIL	4	DISPLACED	1	Lateral	CEMENTED	140
20	268027	RK	52	FEMALE	DOMESTIC FALL	EMPLOYED	PRIVATE SERVICE	3	HTN, CKD	3	DISPLACED	1	Lateral	CEMENTED	145
21	1094087	PC	68	MALE	DOMESTIC FALL	DEPENDENT	NIL	2	NIL	4	DISPLACED	3	Posterior	CEMENTED	130
22	1097713	VR	60	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	2	NIL	4	DISPLACED	1	Posterior	CEMENTED	110
23	1101431	PDJ	93	MALE	DOMESTIC FALL	DEPENDENT	NIL	3	HTN, CAD	3	DISPLACED	2	Lateral	CEMENTED	120
24	150005	AK	76	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	4	COPD, PARKINSONISM	4	DISPLACED	1	Lateral	CEMENTED	105
25	1109366	SD	66	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	3	HTN	3	DISPLACED	2	Posterior	UNCEMENTED	140
26	1112704	PG	63	FEMALE	RTA	DEPENDENT	NIL	3	HTN	4	DISPLACED	1	Posterior	CEMENTED	120
27	1124339	SR	58	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	3	HYPOTHYROIDISM	4	DISPLACED	4	Posterior	CEMENTED	105
28	1131104	US	84	MALE	DOMESTIC FALL	DEPENDENT	NIL	3	HTN, CAD	4	DISPLACED	6	Posterior	UNCEMENTED	130
29	1131306	BRC	72	MALE	DOMESTIC FALL	DEPENDENT	NIL	2	NIL	3	DISPLACED	1	Posterior	CEMENTED	115
30	1137188	HL	69	MALE	RTA	DEPENDENT	NIL	2	NIL	4	DISPLACED	2	Posterior	CEMENTED	100
31	867815	SK	73	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	2	NIL	4	DISPLACED	2	Posterior	CEMENTED	140

S.no	MRD	Name	Age	Intra-op blood loss (ml)	Anesthesia used	Duration of hospital stay (days)	Start of full weight bearing (with support)	Start of full weight bearing (without support)	HHS (<5days)	HHS (4 weeks)	HHS (8 weeks)	HHS (3 months)	HHS (6 months)	Functional outcome	Complications	Time lag between surgery & incidence (Days)	Whether re-operated
1	1009805	AS	82	500	SA	6	2	48	17	41	56	69	89	Good	NIL	NA	NA
2	1015547	RB	76	400	SA	7	1	52	11	30	33	48	78	Fair	NIL	NA	NA
3	1019799	RDM	99	400	SA	6	1	30	25	30	46	66	81	Good	INFECTION	12	NO
4	1023542	MB	90	500	CSE	9	2	36	25	42	63	72	84	Good	NIL	NA	NA
5	1024788	LD	75	350	SA	10	3	27	29	43	59	64	81	Good	NIL	NA	NA
6	44460	AK	69	300	SA	9	2	54	19	45	62	71	81	Good	NIL	NA	NA
7	886795	SB	73	400	SA	9	1	28	29	44	46	66	78	Fair	NIL	NA	NA
8	1029145	SL	57	350	SA	11	1	62	10	32	49	66	81	Good	NIL	NA	NA
9	896223	GK	63	500	SA	6	3	28	32	46	62	67	80	Good	NIL	NA	NA
10	1032978	RK	90	400	SA	6	1	32	32	47	62	64	76	Fair	NIL	NA	NA
11	1032111	BDG	82	500	CSE	8	1	30	28	46	61	64	66	Poor	NIL	NA	NA
12	381083	TS	86	500	CSE	7	1	34	28	46	64	66	79	Fair	NIL	NA	NA
13	1037497	KD	68	400	SA	7	2	40	26	45	49	69	79	Fair	NIL	NA	NA
14	1033176	SD	43	300	SA	6	1	44	26	41	49	64	76	Fair	NIL	NA	NA
15	1038655	S	73	350	SA	7	2	32	30	37	49	59	81	Good	NIL	NA	NA
16	725096	MK	71	500	SA	10	2	50	26	43	52	69	84	Good	NIL	NA	NA
17	1049753	RS	84	500	SA	8	1	48	29	43	62	62	72	Fair	NIL	NA	NA
18	297996	GS	73	400	SA	6	2	40	26	33	47	68	78	Fair	NIL	NA	NA
19	1061448	KK	77	500	SA	7	3	34	28	43	43	66	71	Fair	NIL	NA	NA
20	268027	RK	52	400	SA	9	1	40	25	42	56	67	76	Fair	NIL	NA	NA
21	1094087	PC	68	500	SA	7	2	32	29	45	60	62	78	Fair	NIL	NA	NA
22	1097713	VR	60	400	SA	8	2	30	29	46	62	77	83	Good	NIL	NA	NA
23	1101431	PDJ	93	500	SA	8	3	32	29	35	48	67	81	Good	NIL	NA	NA
24	150005	AK	76	500	SA	9	4	30	29	34	61	66	79	Fair	INFECTION	8	NO
25	1109366	SD	66	500	SA	11	4	35	27	42	53	64	74	Fair	NIL	NA	NA
26	1112704	PG	63	350	SA	10	2	48	27	42	50	62	76	Fair	NIL	NA	NA
27	1124339	SR	58	500	SA	7	1	30	29	37	50	72	82	Good	NIL	NA	NA
28	1131104	US	84	400	CSE	8	2	28	29	43	61	80	80	Good	NIL	NA	NA
29	1131306	BRC	72	400	SA	9	1	33	29	60	76	78	78	Fair	NIL	NA	NA
30	1137188	HL	69	300	SA	8	1	36	29	46	49	64	78	Fair	NIL	NA	NA
31	867815	SK	73	350	SA	8	2	40	29	51	64	74	74	Fair	NIL	NA	NA

S.no	MRD	Name	Age	Sex	Mode of injury	Employment Status	Occupation	ASA Grade	Co-morbidities	Garden type	Displaced/Undisplaced	Time lag between injury and surgery (days)	Approach	Implant used	Duration of Surgery (minutes)
32	1145546	J	72	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	3	HTN, STROKE	3	DISPLACED	1	Posterior	CEMENTED	100
33	1145709	PR	76	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	3	ILD	4	DISPLACED	1	Posterior	CEMENTED	110
34	1151096	RK	77	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	2	NIL	3	DISPLACED	1	Lateral	UNCEMENTED	120
35	1156888	AK	69	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	4	HTN, CAD, CKD	3	DISPLACED	4	Posterior	CEMENTED	135
36	1154354	HR	66	MALE	DOMESTIC FALL	DEPENDENT	NIL	2	NIL	4	DISPLACED	92	Posterior	UNCEMENTED	105
37	879728	SS	80	MALE	DOMESTIC FALL	DEPENDENT	NIL	3	TUBERCULOSIS	4	DISPLACED	3	Lateral	CEMENTED	105
38	1164561	SS	67	MALE	DOMESTIC FALL	DEPENDENT	NIL	2	NIL	3	DISPLACED	1	Lateral	UNCEMENTED	135
39	684246	DDN	67	MALE	DOMESTIC FALL	DEPENDENT	NIL	3	HYPOTHYROIDISM	4	DISPLACED	2	Lateral	CEMENTED	110
40	1163414	K	63	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	3	DM, CLD	4	DISPLACED	1	Lateral	CEMENTED	135
41	1169769	TS	64	MALE	DOMESTIC FALL	EMPLOYED	BUSINESS	2	NIL	3	DISPLACED	1	Posterior	CEMENTED	110
42	1172799	MD	69	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	3	HTN	4	DISPLACED	7	Posterior	CEMENTED	135
43	1167571	DKS	76	MALE	DOMESTIC FALL	DEPENDENT	NIL	2	NIL	3	DISPLACED	2	Posterior	CEMENTED	145
44	1181973	OP	75	MALE	DOMESTIC FALL	DEPENDENT	NIL	2	NIL	3	DISPLACED	1	Posterior	CEMENTED	130
45	1185504	SJ	68	MALE	DOMESTIC FALL	DEPENDENT	NIL	2	NIL	4	DISPLACED	4	Posterior	UNCEMENTED	105
46	5746	NS	80	MALE	DOMESTIC FALL	DEPENDENT	NIL	3	HTN	3	DISPLACED	3	Posterior	CEMENTED	110
47	1193432	JK	61	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	3	HTN	4	DISPLACED	1	Lateral	CEMENTED	135
48	1197182	SJ	85	MALE	DOMESTIC FALL	DEPENDENT	NIL	4	HTN, CAD, DEMENTIA	3	DISPLACED	20	Posterior	CEMENTED	135
49	1197452	BBK	75	MALE	DOMESTIC FALL	DEPENDENT	NIL	2	NIL	3	DISPLACED	5	Posterior	CEMENTED	140
50	9555547	BD	69	MALE	DOMESTIC FALL	DEPENDENT	NIL	3	DM, HTN	4	DISPLACED	7	Lateral	CEMENTED	120
51	1205457	KK	61	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	2	NIL	4	DISPLACED	1	Posterior	CEMENTED	105
52	1205984	MK	81	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	4	CAD, HTN	3	DISPLACED	1	Lateral	CEMENTED	130
53	1208254	SRJ	81	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	3	HTN, RHEUMATOID ARTHRITIS	4	DISPLACED	2	Posterior	CEMENTED	135
54	1211087	MS	80	MALE	DOMESTIC FALL	DEPENDENT	NIL	3	DM, HTN, CKD	4	DISPLACED	8	Lateral	UNCEMENTED	110
55	1214143	VKD	82	MALE	DOMESTIC FALL	DEPENDENT	NIL	3	HTN	4	DISPLACED	1	Posterior	CEMENTED	140
56	555882	MMM	90	MALE	DOMESTIC FALL	DEPENDENT	NIL	3	HTN	4	DISPLACED	2	Posterior	CEMENTED	145
57	1217168	SC	81	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	4	HTN, CAD	4	DISPLACED	2	Posterior	CEMENTED	130
58	1218868	AK	69	MALE	DOMESTIC FALL	EMPLOYED	BUSINESS	2	NIL	4	DISPLACED	1	Lateral	CEMENTED	110
59	748560	GSA	86	MALE	DOMESTIC FALL	DEPENDENT	NIL	3	CAD	4	DISPLACED	1	Posterior	CEMENTED	120

S.no	MRD	Name	Age	Intra-op blood loss (ml)	Anesthesia used	Duration of hospital stay (days)	Start of full weight bearing (with support)	Start of full weight bearing (without support)	HHS (<5days)	HHS (4 weeks)	HHS (8 weeks)	HHS (3 months)	HHS (6 months)	Functional outcome	Complications	Time lag between surgery & incidence (Days)	Whether re-operated
32	1145546	J	72	500	SA	11	3	60	21	36	66	67	67	Poor	FOOT DROP	0	NO
33	1145709	PR	76	500	SA	7	1	44	29	47	53	63	75	Fair	INFECTION	6	NO
34	1151096	RK	77	500	SA	8	1	42	29	42	64	79	79	Fair	NIL		
35	1156888	AK	69	350	SA	8	3	30	29	33	50	74	77	Fair	INFECTION	5	NO
36	1154354	HR	66	400	SA	10	4	40	29	39	56	72	74	Fair	NIL	NA	NA
37	879728	SS	80	300	SA	9	3	42	29	44	70	75	79	Fair	NIL	NA	NA
38	1164561	SS	67	350	SA	9	1	36	29	45	65	67	79	Fair	NIL	NA	NA
39	684246	DDN	67	300	SA	7	2	44	29	51	75	78	83	Good	NIL	NA	NA
40	1163414	K	63	300	SA	8	4	48	29	36	51	53	75	Fair	NIL	NA	NA
41	1169769	TS	64	300	SA	6	2	30	27	43	49	76	76	Fair	INFECTION	11	YES
42	1172799	MD	69	400	SA	7	2	38	29	50	66	82	88	Good	NIL	NA	NA
43	1167571	DKS	76	450	SA	7	1	36	29	46	65	76	80	Good	NIL	NA	NA
44	1181973	OP	75	500	SA	8	2	44	29	43	45	63	73	Fair	NIL	NA	NA
45	1185504	SJ	68	400	SA	9	2	40	29	32	43	48	74	Fair	NIL	NA	NA
46	5746	NS	80	300	SA	9	1	50	29	49	67	80	86	Good	NIL	NA	NA
47	1193432	JK	61	350	SA	8	2	40	29	43	58	76	76	Fair	NIL	NA	NA
48	1197182	SJ	85	400	SA	11	3	35	30	46	67	74	76	Fair	NIL	NA	NA
49	1197452	BBK	75	400	SA	7	2	38	29	43	59	66	76	Fair	NIL	NA	NA
50	9555547	BD	69	500	SA	8	1	30	29	46	59	74	78	Fair	NIL	NA	NA
51	1205457	KK	61	450	SA	9	1	36	29	40	53	59	76	Fair	NIL	NA	NA
52	1205984	MK	81	400	SA	7	2	55	25	29	44	63	81	Good	INFECTION	10	YES
53	1208254	SRJ	81	400	SA	9	3	34	30	43	61	73	75	Fair	NIL	NA	NA
54	1211087	MS	80	350	SA	7	3	40	27	40	56	73	73	Fair	NIL	NA	NA
55	1214143	VKD	82	400	SA	10	1	32	27	41	58	73	73	Fair	NIL	NA	NA
56	555882	MMM	90	500	SA	7	3	28	29	45	57	61	61	Poor	NIL	NA	NA
57	1217168	SC	81	450	SA	7	1	28	31	45	57	61	74	Fair	NIL	NA	NA
58	1218868	AK	69	500	SA	8	2	42	27	41	56	57	74	Fair	NIL	NA	NA
59	748560	GSA	86	500	SA	8	3	48	27	43	45	69	73	Fair	NIL	NA	NA

S.no	MRD	Name	Age	Sex	Mode of injury	Employment Status	Occupation	ASA Grade	Co-morbidities	Garden type	Displaced/Undisplaced	Time lag between injury and surgery (days)	Approach	Implant used	Duration of Surgery (minutes)
60	1222357	SJ	56	FEMALE	RTA	DEPENDENT	NIL	3	DM, HTN, SEIZURE DISORDER	3	DISPLACED	40	Lateral	CEMENTED	135
61	1223127	AKS	73	MALE	DOMESTIC FALL	DEPENDENT	NIL	3	CAD, HTN	4	DISPLACED	5	Posterior	CEMENTED	105
62	1228034	SK	88	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	2	HTN	4	DISPLACED	3	Posterior	CEMENTED	140
63	562519	JR	56	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	4	DM, CAD, CLD	4	DISPLACED	1	Lateral	CEMENTED	135
64	1236217	NS	73	MALE	DOMESTIC FALL	DEPENDENT	NIL	2	NIL	4	DISPLACED	1	Posterior	CEMENTED	150
65	429356	SD	66	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	3	HTN, CAD	3	DISPLACED	9	Posterior	UNCEMENTED	130
66	160765	KU	66	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	2	NIL	3	DISPLACED	2	Lateral	CEMENTED	120
67	890102	PG	81	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	3	DM, CAD	4	DISPLACED	1	Lateral	CEMENTED	130
68	1241018	RK	44	MALE	DOMESTIC FALL	EMPLOYED	BUSINESS	3	DM	3	DISPLACED	1	Posterior	CEMENTED	130
69	351468	SL	67	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	2	NIL	4	DISPLACED	2	Lateral	CEMENTED	115
70	124569	MK	80	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	2	NIL	4	DISPLACED	1	Posterior	CEMENTED	110
71	206587	GS	68	MALE	DOMESTIC FALL	DEPENDENT	NIL	3	CAD	4	DISPLACED	3	Lateral	CEMENTED	120
72	1250782	BK	70	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	3	HTN	3	DISPLACED	1	Posterior	CEMENTED	135
73	1258529	RD	80	FEMALE	RTA	DEPENDENT	NIL	3	CKD	4	DISPLACED	2	Posterior	CEMENTED	130
74	1258098	BS	63	MALE	DOMESTIC FALL	DEPENDENT	NIL	3	HTN	4	DISPLACED	1	Lateral	CEMENTED	120
75	1259553	JK	70	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	2	NIL	4	DISPLACED	3	Posterior	CEMENTED	130
76	1263245	VK	73	MALE	DOMESTIC FALL	DEPENDENT	NIL	3	ILD	4	DISPLACED	2	Lateral	CEMENTED	110
77	1265545	RK	80	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	4	HTN, CAD	4	DISPLACED	2	Posterior	CEMENTED	105
78	1268117	SS	68	MALE	DOMESTIC FALL	EMPLOYED	BUSINESS	2	NIL	4	DISPLACED	1	Lateral	CEMENTED	100
79	1273996	VKG	63	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	2	NIL	4	DISPLACED	2	Posterior	CEMENTED	110
80	1273659	DD	65	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	2	NIL	3	DISPLACED	5	Posterior	CEMENTED	115
81	735225	NK	76	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	3	CAD	4	DISPLACED	1	Lateral	CEMENTED	120
82	1063304	KS	70	MALE	DOMESTIC FALL	DEPENDENT	NIL	3	HTN, CAD, CKD, STROKE	4	DISPLACED	11	Lateral	CEMENTED	165
83	1272477	CR	86	FEMALE	DOMESTIC FALL	DEPENDENT	NIL	3	HTN, CAD	3	DISPLACED	2	Posterior	CEMENTED	150

S.no	MRD	Name	Age	Intra-op blood loss (ml)	Anesthesia used	Duration of hospital stay (days)	Start of full weight bearing (with support)	Start of full weight bearing (without support)	HHS (<5days)	HHS (4 weeks)	HHS (8 weeks)	HHS (3 months)	HHS (6 months)	Functional outcome	Complications	Time lag between surgery & incidence (Days)	Whether re-operated
60	1222357	SJ	56	450	SA	9	4	38	27	41	58	71	73	Fair	NIL	NA	NA
61	1223127	AKS	73	500	SA	10	3	42	27	44	57	69	73	Fair	NIL	NA	NA
62	1228034	SK	88	400	SA	7	2	40	27	40	51	66	73	Fair	HIP DISLOCATION	8	NO
63	562519	JR	56	450	SA	7	3	38	27	40	53	68	70	Fair	NIL	NA	NA
64	1236217	NS	73	300	SA	8	2	35	27	44	55	67	71	Fair	NIL	NA	NA
65	429356	SD	66	350	SA	9	1	36	27	45	57	61	71	Fair	NIL	NA	NA
66	160765	KU	66	400	SA	9	1	40	27	43	68	68	73	Fair	NIL	NA	NA
67	890102	PG	81	450	SA	7	3	36	25	42	53	62	79	Fair	NIL	NA	NA
68	1241018	RK	44	300	SA	9	1	44	27	42	46	58	71	Fair	NIL	NA	NA
69	351468	SL	67	350	SA	8	1	22	32	42	56	71	71	Fair	NIL	NA	NA
70	124569	MK	80	400	SA	9	1	30	30	44	56	71	71	Fair	NIL	NA	NA
71	206587	GS	68	500	SA	11	4	30	31	44	51	51	51	Poor	NIL	NA	NA
72	1250782	BK	70	450	SA	10	1	38	29	42	53	69	76	Fair	NIL	NA	NA
73	1258529	RD	80	300	SA	7	1	37	29	42	54	72	74	Fair	NIL	NA	NA
74	1258098	BS	63	300	SA	9	2	50	25	34	45	45	61	Poor	INFECTION	20	YES
75	1259553	JK	70	350	SA	7	2	38	29	43	57	62	77	Fair	NIL	NA	NA
76	1263245	VK	73	500	SA	8	3	21	32	43	55	69	76	Fair	NIL	NA	NA
77	1265545	RK	80	400	SA	9	2	44	27	46	49	59	71	Fair	NIL	NA	NA
78	1268117	SS	68	400	SA	9	1	30	29	49	60	74	78	Fair	NIL	NA	NA
79	1273996	VKG	63	450	SA	8	1	28	29	43	53	74	76	Fair	NIL	NA	NA
80	1273659	DD	65	300	SA	7	1	23	31	46	62	75	79	Fair	NIL	NA	NA
81	735225	NK	76	450	CSE	9	1	24	29	49	64	64	75	Fair	NIL	NA	NA
82	1063304	KS	70	500	CSE	13	4	76	29	42	42	60	74	Fair	INFECTION	12	NO
83	1272477	CR	86	350	SA	11	3	48	29	42	42	57	69	Poor	INFECTION	4	NO

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The Principal,
DMC, Ludhiana.

Subject: **Approval of Plan of Thesis.**

This is to inform you that the Faculty of Medical Sciences in its meeting held on 29.10.2021 has approved the plan of thesis of **Malwinder Singh**, a student of your college for **MS Orthopaedics** along with the names of Supervisor/Co-Supervisor as under:-

Topic Plan of Thesis

Comparison of outcomes in patients undergoing hemiarthroplasty of the hip joint by posterior versus lateral approach.

Supervisor
Dr. Pankaj Mahindra
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DMCH, Ludhiana.

Co-Supervisor

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The student has to submit the four copies of thesis (along with PDF format) , to the Controller of Examinations, BFUHS, Faridkot, at least six months before the commencement of theory examination, if he/she is otherwise eligible to take the examination. He /She must directed to attach a photocopy of this letter with the forwarding letter while submitting thesis to the University along with the letter of approval of University for change of supervisor/Co-Supervisor, change of topic,(if any).

Dr. S P Singh MS(Oph)
Controller of Examinations

Note :

143. If any discrepancy found regarding topic of thesis or Supervisor/Co-Supervisor, inform undersigned within one month after issue of this letter.

144. The student may submit the thesis as per the schedule already conveyed i.e for May/June examination 30th Nov of the preceding the year of examination and for Nov/Dec examinations 31st May of the year of examination.

COMPARISON OF OUTCOMES IN PATIENTS UNDERGOING HEMIARTHROPLASTY OF THE HIP JOINT BY POSTERIOR VERSUS LATERAL APPROACH

THESIS PROPOSAL

FOR APPROVAL OF SUBJECT OF THESIS TO BE SUBMITTED

IN PARTIAL FULFILMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

MASTER OF SURGERY

IN

ORTHOPAEDICS

OF THE

BABA FARID UNIVERSITY OF HEALTH SCIENCES

FARIDKOT

MARCH 2021 **DR. MALWINDER SINGH**

DEPARTMENT OF ORTHOPAEDICS
DAYANAND MEDICAL COLLEGE AND HOSPITAL
LUDHIANA

ABSTRACT OF PLAN OF THESIS

Title	COMPARISON OF OUTCOMES IN PATIENTS UNDERGOING HEMIARTHROPLASTY OF THE HIP JOINT BY POSTERIOR VERSUS LATERAL APPROACH
For the degree of	MS Orthopaedics
Name of the candidate	Dr. Malwinder Singh
Supervisor	Dr. Pankaj Mahindra, Associate Professor, Department of Orthopedics, DMC&H Ludhiana
Co-supervisor	Dr. Harpal Singh Selhi, Professor, Department of Orthopedics, DMC&H Ludhiana
Institution	Dayanand Medical College & Hospital, Ludhiana
University	Baba Farid University of Health Sciences, Faridkot

Introduction: Hip hemiarthroplasty has proven to be an effective treatment for displaced femoral neck fractures, typically indicated in patients including the elderly with displaced femoral neck fractures without osteoarthritis and the medically infirm for whom the additional risks of a total hip replacement do not outweigh the functional benefits.[1] Hemiarthroplasty has been found to improve function and to be having a lower reoperation rate than internal fixation.[2] Harris Hip Score is a questionnaire-based scoring system that has been widely used universally for assessing hip function. This instrument has 10 items in 3 sections describing pain, function, range of motion, and deformity.[3]

Aim of Study: To evaluate the functional outcome in the immediate post-operative period as well as at 4 weeks, 8 weeks, 3 months and 6 months in patients undergoing Hemiarthroplasty using the posterior and lateral approaches and to statistically establish the difference in the mean outcome between the two approaches, if any.

Materials & methods: All the patients scheduled to undergo Hemiarthroplasty of the hip joint in Dayanand Medical College & Hospital, Ludhiana will be initiated for the study and evaluated in the immediate post-operative period on the basis of peri-operative blood loss, length of hospital stay, as well as evaluated using the Harris Hip Score (HHS) in the immediate post-operative period, and then at 4 weeks, 8 weeks, 3 months & 6 months respectively, and incidence of complications, to analyse the functional outcome in patients operated using the posterior and lateral approaches.

Clinical Significance: The present study is meant to evaluate the outcome of hemiarthroplasties done using the posterior and the direct lateral approaches respectively, based on standard scores, and incidence of hip dislocation, which reflect the functional outcome, as well as parameters like post-operative blood loss, length of hospital stay etc.

Keywords:

(Signature)	(Signature)	(Signature)	(Signature)
Candidate	Co-supervisor	Supervisor	Principal

CERTIFICATE OF FACILITIES AVAILABLE

This is to certify that the facilities for work on the subject of thesis titled **"COMPARISON OF OUTCOMES IN PATIENTS UNDERGOING HEMIARTHROPLASTY OF THE HIP JOINT BY POSTERIOR VERSUS LATERAL APPROACH"** exist in the Department of Orthopaedics, DMC&H, Ludhiana and will be provided to be candidate. We will see that the data being included in the thesis are genuine and is collected by the candidate himself under our supervision and guidance.

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Place: _____

Date: _____

APPROVAL PROFORMA
BY RESEARCH & ETHICAL COMMITTEE
DAYANAND MEDICAL COLLEGE & HOSPITAL, LUDHIANA

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Department	ORTHOPAEDICS
Topic of Thesis	COMPARISON OF OUTCOMES IN PATIENTS UNDERGOING HEMIARTHROPLASTY OF THE HIP JOINT BY POSTERIOR VERSUS LATERAL APPROACH
Likely date of appearing in PG examination	MAY 2023
Date of enrollment	26 JULY 2020
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Signature of Members of Research Committee with Stamp	**Signature of Members of Ethics Committee with Stamp**
Dr. Harpreet Kaur (Professor & Head, Pathology)	Mr. R K Sharma (Legal Expert)
Dr. Jaspal Singh (Professor & Head, Surgery)	Dr. Ramit Mahajan (Associate Professor, Gastroenterology)
Dr. Dinesh Gupta (Professor & Head, Medicine)	Dr. Anu Sharma (Professor, Anatomy)
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Dr. Gurpreet S Wander (Vice Principal)	Dr. Gurpreet S Wander (Vice Principal & Professor & Head, Cardiology)
	Dr. Gagandeep Singh (Secretary, Ethics Committee Professor & Head, Neurology)

Approved: Yes / No

Dr. Sandeep Puri
Chairperson
Research Committee

Approved: Yes / ~~No~~

Prof. Arvind Malhotra
Chairperson
Ethics Committee

BABA FARID UNIVERSITY OF HEALTH SCIENCES, FARIDKOT

PROFORMA FOR REGISTRATION OF SUBJECT FOR DISSERTATION

1	NAME OF THE CANDIDATE AND ADDRESS	Malwinder Singh S/O Avtar Singh #100, Upkar Nagar, Patiala, Punjab - 147001
2	NAME OF THE INSTITUTE	Dayanand Medical College & Hospital, Ludhiana
3	COURSE OF STUDY AND SUBJECT	MS Orthopaedics
4	DATE OF ADMISSION OF COURSE	26JULY 2020
5	TITLE OF THE TOPIC	Comparison of outcomes in patients undergoing Hemiarthroplasty of the hip joint by Posterior versus Lateral approach

6. BRIEF RESUME OF THE INTENDED WORK

6.1 NEED FOR THE STUDY

Hemiarthroplasty of the hip joint, or the surgical refashioning of the hip joint is indicated for a number of traumatic as well as incapacitating conditions. Operations on the hip joint are among the most often performed surgical procedures performed in orthopaedics. Open approaches to the hip joint are required for hemiarthroplasties, tumor surgery, and for the treatment of infection around the hip joint.[1-4] The principles of surgical exposure include a thorough knowledge of anatomy of the region and its variations[5], proper patient positioning and adequate incisions. Dissections through natural cleavage planes help to minimize bleeding and disruption of important functional structures.

The **direct lateral approach** (or **Hardinge** or **transgluteal approach**) allows excellent exposure of the hip joint. The direct lateral approach releases the anterior third of gluteus medius and minimus, while preserving the posterior femoral attachment of the major part of these muscles. The proximal part of the incision is limited by the superior gluteal nerve and vessels, crossing 3-5 cm proximal to the tip of the greater trochanter. Distally, the anterior fibers of vastus lateralis are elevated from the anterior femur. The anterior attachment of the hip capsule is next released from the anterior base of the femoral neck, and an anterior longitudinal capsulotomy is opened as necessary with a proximal transverse T-shaped incision.[6]

It avoids the need for trochanteric osteotomy. Because the bulk of the gluteus medius muscle is preserved intact, it permits early mobilization of the patient following surgery.[7] This approach may lead to abductor insufficiency, resulting in a positive Trendelenburg sign or limping after surgery.[8]

The **posterior approach** is the most common and practical of those used to expose the hip joint. Popularized by **Moore**, it is often called the **Southern approach**. In this the Gluteus maximus fibres by blunt

dissection and cut the short external rotators to expose the capsule. The Gluteus medius is not disturbed by this approach. This is the standard posterior approach most commonly used in practice.[9]

All posterior approaches allow easy, safe, and quick access to the joint and can be performed with only one assistant. Because they do not interfere with the abductor mechanism of the hip, they avoid the loss of abductor power in the immediate postoperative period. Posterior approaches allow excellent visualization of the femoral shaft, thus are popular for revision joint replacement surgery in cases in which the femoral component needs to be replaced.[10] However, due to inadequate posterior capsule support the risk of dislocations is significantly higher compared to the direct lateral approach.[11]

There is dearth of data dealing with the study of functional outcomes by both approaches in patients undergoing the operative procedure in developing countries, especially India, where the use of the hip joint, posture and other peculiarities warrant a dedicated study with respect to mobility and improvement in the range of motion as well as using a standardised and universally accepted score to statistically establish the difference if any over a period of time after the operation and insertion of the prosthetic implants using both the approaches.

Harris Hip score will be used to assess the functional outcome of Hemiarthroplasty in this study. The components of Harris Hip Score (HHS) are:

1. Pain
2. Function/Gait
3. Functional activities

Range of motion

6.2 REVIEW OF LITERATURE

Hemiarthroplasty for fracture of neck of femur is a common surgical procedure. A number of distinct approaches are used to access the hip joint. The most commonly used are the direct lateral approach (DLA), and the posterior approach (PA). Internationally there is little consensus on which of these approaches to use. Current guidance is based on a limited selection of evidence and choice of approach is frequently based on surgeon preference. Historically, recommendations have been made based on dislocation rates. In light of technical advancements and greater recognition of patient priorities, outcomes such as post-operative function and pain may be considered more important in the modern context.[12]

The **HARRIS HIP SCORE** as a tool for assessing site-specific hip function has widespread acceptance. The HHS was proposed by William H. Harris when he studied thirty-nine mold arthroplasties performed at the Massachusetts General Hospital between 1945 and 1965 in patients for arthritis of the hip following fractures of the acetabulum or dislocations of the hip.[13] At the time of its development, the HHS was compared with two existing tools, The Shepherd system and the Larson system, there was however no detailed statistical analysis performed to determine construct validation. The Harris Hip Score has now been tested against the SF-36 and the WOMAC score, and it has been shown to have high reliability, validity, and responsiveness.[14]

HONGISTO et al[15] conducted a study on a total of 393 femoral neck fracture patients aged 65 years or more who underwent hemiarthroplasty for 12 months. Patient information was collected on admission, during hospitalization, and by telephone interview 1 year after the hip fracture. At 1 year after hip fracture, more patients undergoing hemiarthroplasty with the posterior approach (22%) survived without mobility aids compared to those with the lateral approach (12%; p = 0.026). Multivariate logistic regression analysis revealed that the need for mobility aids 1 year after hip fracture was significantly predicted by age ≥85 years (odds ratio = 3.85,

95% confidence interval = 1.09-13.44), male sex (odds ratio = 3.59, 95% confidence interval = 1.05-12.22), and lateral approach (odds ratio 2.73, 95% confidence interval 1.15-6.50). The posterior approach resulted in four (3.4%) dislocated hips, compared with none by the lateral approach. Survival, mobility level, pain in the operated hip, and living arrangements 1 year postoperatively were not significantly different between groups. Hence the study concluded that lateral approach predisposed to the need for ambulatory aids 1 year after hip fracture. The posterior approach, however, predisposed to hip dislocation.

SVENØY et al[16] conducted a prospective clinical study on 583 patients with 1 year follow-up to compare early complications after hemiarthroplasty using the posterior and the direct lateral approach. A higher risk was found for prosthetic dislocation in the posterior group compared to the lateral group (15/186 (8%) vs. 4/397 (1%); RR=8.0, 95% CI 2.7-23.8, p-value<0.001), both as a one-time event and for the risk of recurrent dislocations (9/186 (5%) vs. 2/395 (0.5%); RR 9.6, 95% CI 2.1-44.0, p-value=0.001). They concluded that here was an 8-fold increased risk for prosthetic dislocations after hemiarthroplasties performed using the posterior approach compared to lateral approach and a subsequent risk for further surgeries and a poor end result.

PRASAD et al[17] conducted a prospective comparative study comprising of series of 80 patients with intracapsular neck femur fractures between 50 to 80 years of age treated with hemiarthroplasty either by posterior approach or lateral approach from October 2014 to October 2016. Patients were divided into two equal groups, group A and B operated with posterior and lateral approach respectively. Several variables including age, sex, operative time, blood loss, early surgical and post-operative complications, post-operative care, hip function and final outcome measures were noted and compared between two groups. In this study, the average Harris Hip Score at 1 year follow up was 85.62 in posterior surgical approach and 83.40 in lateral approach. Patients in both groups

had good average Harris Hip Score and the difference was statically insignificant. However the posterior approach was observed to be carrying an increased risk of prosthetic dislocation as compared to the lateral approach. The rate of secondary procedures was also higher with posterior approach (12.5%) as compared to the lateral approach (7.5%). The authors concluded that there were no notable differences in outcomes and complications between the two approaches. Neither lateral nor the posterior approaches seem to offer a clear advantage regarding the early surgical complications, and a decision in favour of one surgical approach cannot be based on evidence on early surgical complication rates alone.

PETIS et al[18] conducted a meta-analysis using the available online literature including comparative studies published from 2000 to 2014 mentioning the direct anterior, direct lateral and posterior approaches and concluded that the anterior, lateral and posterior approaches each have unique advantages and disadvantages. High-quality clinical comparisons among the approaches are lacking in the literature; therefore they concluded that surgeon preference is likely more a function of training and anecdotal success.

LEONARDSSON et al[19] conducted a prospective observational study on 2118 subjects having undergone hemiarthroplasty in 2009, with a mean age of 85 years. They observed that patients who had undergone surgery through a posterior approach reported a higher health-related quality of life (HRQoL, EQ-5D mean 0.52 versus 0.47, $p = 0.009$), less pain (visual analogue scale mean 17 versus 19, $p = 0.02$) and greater satisfaction with the result of surgery (visual analogue scale mean 22 versus 24, $p = 0.02$) than those who had a direct lateral approach. However, after adjusting for age, gender, cognitive impairment and American Society of Anesthesiologists grade, no association was found between surgical approach and HRQoL, residual pain or patient satisfaction.

ROGMARK et al[20] conducted Cox regression analyses on 33,205 cases of hip fractures in individuals > 60 years of age treated with modular

hemiarthroplasty. Analyses based on reoperations were performed (covariates: age group, sex, type of stem and implant head, surgical approach, and hospital volume). It was found that posterior approach increased the risk of reoperation due to dislocation and periprosthetic fracture, but reduced the risk of erosion/other complications as compared to the lateral approach. **KRISTENSEN et al**[21] conducted a study on 20,908 cases of hemiarthroplasties due to femoral neck fracture in patients aged 60 years and older from the Norwegian Hip Fracture Register, using either the direct lateral (n= 18,918) or the posterior (n= 1,990) approach. PROM data (satisfaction, pain, quality of life (EQ-5D), and walking ability) were reported 4, 12, and 36 months postoperatively. The Cox regression model was used to calculate relative risk (RR) of reoperation. The study concluded that patients operated with hemiarthroplasty using the posterior approach had less pain, were more satisfied, and had a better quality of life than those operated with direct lateral approach. In addition, a larger group of those operated with the posterior approach had fewer walking problems postoperatively.

PARKER et al[22] conducted a randomized controlled trial on a group of 216 patients with an intracapsular hip fracture being treated with a cemented hemiarthroplasty with either the posterior or the direct lateral approach. Surviving patients were followed up for a period of one year. No statistically significant differences were observed for any of the outcome measures including mortality, modified Charnley pain score and regaining of walking ability. Both surgical approaches appeared to produce comparable function outcomes.

UNWIN et al[23] conducted a study comparing 3-month dislocation rate in 2906 primary hemiarthroplasties done using the direct lateral or posterior approach. The overall dislocation rate for the posterior approach was 9.0%, whereas that for the direct lateral approach was 3.3%. The difference was found to be statistically highly significant.

6.3 AIMS AND OBJECTIVES OF THE STUDY

AIMS: To evaluate the functional outcome in the immediate post-operative period as well as at 4 weeks, 8 weeks, 3 months and 6 months in patients undergoing Hemiarthroplasty using the posterior and lateral approaches and to statistically establish the difference in the mean outcome between the two approaches, if any.

OBJECTIVES: To evaluate patients operated using the posterior and lateral approaches in the immediate post-operative period on the basis of peri-operative blood loss, length of hospital stay, as well as evaluated using the Harris Hip Score (HHS) in the immediate post-operative period, and then at 4 weeks, 8 weeks, 3 months & 6 months respectively, and incidence of complications.

7. MATERIALS AND METHODS

1) This study is a prospective study. Patients operated with Hemiarthroplasty from 1st January 2021 through 31st March 2022 and willing to participate in the study will be included.

3) The results of the study will be based on the functional outcomes of the patients till a follow up period of 6 months from the date of surgery.

5) The functional outcome will be based on the **Harris Hip Score** and the incidence of complications.

The trauma patients coming to casualty in Dayanand Medical College and Hospital will be initially managed by the ATLS protocol: airway, breathing, circulation and monitoring all the vitals of patient accordingly i.e. blood pressure, heart rate, and oxygen saturation. After managing the patient hemodynamically by transfusing blood for blood loss, look for other injuries and appropriately get the x rays done accordingly i.e. x-ray pbh view, x-ray hip with thigh for fractures of neck of femur. All the basic investigation -complete blood count, renal function test, ABG, chest x-ray will be sent, patient simultaneously will be administered prophylactic antibiotic to prevent sepsis and pain killers for pain. Then patient will be taken to operation theatre and managed by Hemiarthroplasty as a permanent fixation method. Physiotherapy like full weight bearing walking with walker of the affected side and quadriceps exercises started on first postoperative day till the fracture union. Serial follow up of the patients are made at 4 weeks, 6weeks, 3months, 6 months to know the functional outcome.

Harris Hip Score and the incidence of complications is used to assess the functional outcome.

7.1 SOURCE OF DATA

It will be a prospective study for cases from 1st January 2021 through 31st March 2022 for all the patients admitted in Dayanand Medical College and Hospital under department of orthopaedics diagnosed as fractures of neck

of femur and selected for Hemiarthroplasty after considering the inclusion and exclusion criteria which is as follows:

7.2 METHOD OF COLLECTION OF DATA

Study setting:

Collection of data as per the standard performa with consent obtained from patients admitted in the department of Orthopaedics, Dayanand Medical College & Hospital, Ludhiana from 1st January 2021 through 31st March 2022.

INCLUSION CRITERIA:

- Surgeries done using the posterior or lateral approach
- Patients diagnosed as having fracture of neck of Femur
- Patients who have given consent to undergo the procedure and are willing for follow-up
- Follow-up upto 6 months duration

EXCLUSION CRITERIA:

- Revision surgery
- Contralateral Hip surgery
- Pathological fractures

Surgeries done using approaches other than the posterior and lateral approach

DURATION OF STUDY: Patients operated at Dayanand Medical College and Hospital from 1st January 2021 through 31st March 2022 and willing to participate in the study will be included in the study.

OUTCOME: To evaluate patients operated using the posterior and lateral approaches in the immediate post-operative period on the basis of peri-operative blood loss, length of hospital stay, as well as evaluated using the Harris Hip Score (HHS)in the immediate post-operative period, and then at 4 weeks, 8 weeks, 3 months & 6 months respectively, and the incidence of complications.

STATISTICAL ANALYSIS: Data will be described in terms of range; mean ±standard deviation (± SD), frequencies (number of cases) and

relative frequencies (percentages) as appropriate. Comparison of quantitative variables between the study groups will be done using Student t-test and Mann Whitney U test for independent samples for parametric and non-parametric data respectively. For comparing categorical data, Chi square ($\chi 2$) test will be performed and exact test was used when the expected frequency is less than 5. A probability value (p value) less than 0.05 will be considered statistically significant. All statistical calculations will be done using (Statistical Package for the Social Science) SPSS 21version (SPSS Inc., Chicago, IL, USA) statistical program for Microsoft Windows

7.3 DOES THE STUDY REQUIRE ANY INVESTIGATIONS OR INTERVENTIONS TO BE CONDUCTED ON PATIENTS OR OTHER HUMANS OR ANIMALS ? IF SO, PLEASE DESCRIBE BRIEFLY.

This study requires surgical intervention in patients diagnosed with having fractures of neck of femur.

7.4 HAS ETHICAL CLEARENCE BEEN OBTAINED FROM YOUR INSTITUTION IN CASE OF 7.3 ?

Yes, and attached herewith

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PROFORMA

S. NO:

AGE: SEX:

NAME: ADMISSION NO:

MRD NO:

DATE OF ADMISSION: DATE OF DISCHARGE:

RELIGION: OCCUPATION:

DATE OF INJURY:

MODE OF INJURY: ROAD SIDE ACCIDENT/DOMESTIC FALL/OTHER

EMPLOYMENT STATUS: EMPLOYED/DEPENDENT

ASA GRADE: I / II / III/ IV / V /VI

CO-MORBIDITIES (if any): DIABETES MELLITUS TYPE 2, HYPERTENSION, HYPOTHYROIDISM, Other:

LOCAL EXAMINATION:

OPEN/CLOSED FRACTURE:

GRADE OF FRACTURE:

SKIN CONDITION :

X RAY FINDINGS:

FRACTURE CLASSIFICATION:GARDEN CLASSIFICATION TYPE I/ TYPE II/ TYPE III/ TYPE IV

SITE OF FRACTURE:

DISPLACED/UNDISPLACED FRACTURE:

DATE OF SURGERY:

TIME LAG BETWEEN DATE OF INJURY AND DATE OF SURGERY (DAYS):

Signature of Candidate **Signature of Supervisor**

OPERATION/PROCEDURE DONE:

APPROACH USED: POSTERIOR/LATERAL/OTHER

IMPLANT USED: CEMENTED/UNCEMENTED
DURATION OF SURGERY:

BLOOD LOSS-

ANAESTHESIA USED: GENERAL ANAESTHESIA/SPINAL

ANAESTHESIA/COMBINED SPINAL EPIDURAL ANAESTHESIA

POSTOPERATIVE LIMB LENGTH DISCREPANCY (LLD):

DURATION OF HOSPITAL STAY-

START OF FULL WEIGHT BEARING WALKING

- WITH SUPPORT (DATE):
  - DAYS FROM THE DAY OF SURGERY:
- WITHOUT SUPPORT (DATE):
  - DAYS FROM THE DAY OF SURGERY:

FUNCTIONAL OUTCOME ASSESSED BY:

(1) HARRIS HIP SCORE :

- PAIN (CHECK ONE)
  - NONE OR IGNORES IT (44)
  - SLIGHT, OCCASIONAL, NO COMPROMISE IN ACTIVITIES (40)
  - MILD PAIN, NO EFFECT ON AVERAGE ACTIVITIES, RARELY MODERATE PAIN WITH UNUSUAL ACTIVITY; MAY TAKE ASPIRIN (30)
  - MODERATE PAIN, TOLERABLE BUT MAKES CONCESSION TO PAIN.
  - OCCASIONAL PAIN MEDICATION STRONGER THAN ASPIRIN (20)
  - MARKED PAIN, SERIOUS LIMITATION OF ACTIVITIES (10
  - TOTALLY DISABLED, CRIPPLED, PAIN IN BED, BEDRIDDEN (0)
- LIMP
  - NONE (11)
  - SLIGHT (8)
  - MODERATE (5)
  - SEVERE (0)

Signature of Candidate **Signature of Supervisor**

- SUPPORT
  - NONE (11)
  - CANE FOR LONG WALKS (7)
  - CANE MOST OF TIME (5)
  - ONE CRUTCH (3)
  - TWO CANES (2)
  - TWO CRUTCHES OR NOT ABLE TO WALK (0)
- DISTANCE WALKED
  - UNLIMITED (11)
  - SIX BLOCKS (8)
  - TWO OR THREE BLOCKS (5)
  - INDOORS ONLY (2)
  - BED AND CHAIR ONLY (0)
- SITTING
  - COMFORTABLY IN ORDINARY CHAIR FOR ONE HOUR (5)
  - ON A HIGH CHAIR FOR 30 MINUTES (3)
  - UNABLE TO SIT COMFORTABLY IN ANY CHAIR (0)
- ENTER PUBLIC TRANSPORTATION
  - YES (1)
  - NO (0)
- STAIRS
  - NORMALLY WITHOUT USING A RAILING (4)
  - NORMALLY USING A RAILING (2)
  - UNABLE TO DO STAIRS (0)
- PUT ON SHOES AND SOCKS
  - WITH EASE (4)
  - WITH DIFFICULTY (2)
  - UNABLE (0)
- ABSENCE OF DEFORMITY (ALL YES = 4; LESS THAN 4 =0)
  - LESS THAN 30° FIXED FLEXION CONTRACTURE: YES/NO
  - LESS THAN 10° FIXED ABDUCTION: YES/NO
  - LESS THAN 10° FIXED INTERNAL ROTATION IN EXTENSION:YES/NO
  - LIMB LENGTH DISCREPANCY LESS THAN 3.2 CM: YES/NO
- RANGE OF MOTION (*INDICATES NORMAL)
  - FLEXION (*140°) _____
  - ABDUCTION (*40°) _____
  - ADDUCTION (*40°) _____

Signature of Candidate **Signature of Supervisor**

- EXTERNAL ROTATION (*40°) _____
- INTERNAL ROTATION (*40°) _____

- RANGE OF MOTION SCALE

  - 211° - 300° (5)
  - 161° - 210° (4)
  - 101° - 160° (3)
  - 61° - 100 (2)
  - 31° - 60° (1)
  - 0° - 30° (0)

RANGE OF MOTION SCORE _____
TOTAL HARRIS HIP SCORE _____

POSTOPERATIVE :
AT 4 WEEKS:
AT 8 WEEKS:
AT 3 MONTHS:
AT 6 MONTHS:

(2) INCIDENCE OF COMPLICATION(s):

- PERIPROSTHETIC FRACTURE

  - DATE OF INCIDENCE:
  - TIME LAG BETWEEN SURGERY AND INCIDENCE:
  - WHETHER RE-OPERATED: YES/NO

- HIP DISLOCATION
  - DATE OF INCIDENCE:
  - TIME LAG BETWEEN SURGERY AND INCIDENCE:
  - WHETHER RE-OPERATED: YES/NO

- INFECTION
  - DATE OF INCIDENCE:
  - TIME LAG BETWEEN SURGERY AND INCIDENCE:
  - WHETHER RE-OPERATED: YES/NO

Signature of Candidate **Signature of Supervisor**

- ASPETIC LOOSENING
  - DATE OF INCIDENCE:
  - TIME LAG BETWEEN SURGERY AND INCIDENCE:
  - WHETHER RE-OPERATED: YES/NO

- OTHER
  - DATE OF INCIDENCE:
  - TIME LAG BETWEEN SURGERY AND INCIDENCE:
  - WHETHER RE-OPERATED: YES/NO

Signature of Candidate **Signature of Supervisor**

INFORMED PATIENT CONSENT

Date: _____

I.....D/o, W/o, S/o.....
.....am willing to participate in the study **"COMPARISON OF OUTCOMES IN PATIENTS UNDERGOING HEMIARTHROPLASTY OF THE HIP JOINT BY POSTERIOR VERSUS LATERAL APPROACH"** The procedure with its complications has been explained to me in local vernacular language. I have fully understood that no special tests and extra expenditure in any form, merely for the purpose of thesis is being carried out. I am free to opt out the study any time without assigning any reason.

.....
Signature of the Witness

.....
Signature of the patient

Name:

Signature of Candidate

Signature of Supervisor

मरीज अनुमति फार्म

तिथि _____

मैं _____ पत्नी/पुत्र/पुत्री _____

निवासी _____

इस शोधकार्य **"COMPARISON OF OUTCOMES IN PATIENTS UNDERGOING HEMIARTHROPLASTY OF THE HIP JOINT BY POSTERIOR VERSUS LATERAL APPROACH"** में भाग लेने के लिए सहमत हूँ। मैं इस शोधकार्य में भाग लेने के लिए अपनी स्वेच्छा से तैयार हूँ। मैं पुष्टि करता/करती हूँ की यह स्वीकृति देने के लिए मुझे कोई आर्थिक प्रलोभन नहीं दिया गया और न ही दबाव डाला गया है। मुझे इस शोधकार्य का उद्देश्य स्पष्ट कर दिया गया है और मुझे यह विश्वास है की यह विज्ञान और मानवता के लाभ के लिए है। मुझे इस शोधकार्य में होने वाले जोखिम के बारे में समझा दिया गया है और मेरी समझ में यह जोखिम बहुत मामुली है।

मैं इस शोधकार्य में भाग लेने के सम्बन्ध में किसी भी समय अपनी अस्वीकृति व्यक्त कर सकता/सकती हूँ और मेरे अस्वीकृति व्यक्त करने का मेरे इलाज पर कोई प्रभाव नहीं पड़ेगा।

_____ _____

गवाह के हस्ताक्षर रोगी के हस्ताक्षर/अंगूठे का निशान

नाम: नाम:

_____

अन्वेषक के हस्ताक्षर

_____

विद्यार्थी के हस्ताक्षर

ਮਰੀਜ਼ ਰਜ਼ਾਮੰਦੀ ਫਾਰਮ

ਮਿਤੀ_____

ਮੈ_____ਪਤਨੀ/ਪੁੱਤਰ/ਪੁੱਤਰੀ_____

ਵਾਸੀ _____

"COMPARISON OF OUTCOMES IN PATIENTS UNDERGOING HEMIARTHROPLASTY OF THE HIP JOINT BY POSTERIOR VERSUS LATERAL APPROACH" ਤੇ ਚਲ ਰਹੀ ਖੋਜ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਰਜ਼ਾਮੰਦ ਹਾਂ। ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਮੈ ਆਪਣੀ ਮਰਜ਼ੀ ਨਾਲ ਤਿਆਰ ਹਾਂ। ਮੈ ਇਹ ਦਸਣਾ ਚਾਹੁੰਦਾ ਹਾਂ/ ਚਾਹੁੰਦੀ ਹਾਂ ਕੇ ਇਹ ਰਜ਼ਾਮੰਦੀ ਦੇਣ ਵਾਸਤੇ ਮੈਨੂ ਕਿਸੇ ਵੀ ਤਰਾਂ ਦਾ ਲੋਭ-ਲਾਲਚ ਨਹੀ ਦਿੱਤਾ ਗਿਆ ਅਤੇ ਨਾ ਹੀ ਕੋਈ ਦਬਾ ਪਾਇਆ ਗਿਆ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਦਾ ਮਨੋਰਥ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਭਰੋਸਾ ਦਵਾਇਆ ਗਿਆ ਹੈ ਕੇ ਇਹ ਖੋਜ ਵਿਗਿਆਨ ਅਤੇ ਮਾਨਵਤਾ ਦੀ ਭਲਾਈ ਲਈ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਵਿਚ ਹੋਣ ਵਾਲੇ ਖਤਰੇ ਬਾਰੇ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਯਕੀਨ ਹੈ ਕੇ ਇਹ ਖਤਰਾ ਬਹੁਤ ਮਾਮੂਲੀ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਦਾ ਢੰਗ – ਤਰੀਕਾ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ।

ਮੈ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਬਾਰੇ ਆਪਣੀ ਰਜ਼ਾਮੰਦੀ ਕਿਸੇ ਵੀ ਸਮੇ ਵਾਪਸ ਲੈ ਸਕਦਾ ਹਾਂ/ ਸਕਦੀ ਹਾਂ ਅਤੇ ਮੇਰੀ ਰਜ਼ਾਮੰਦੀ ਵਾਪਸ ਲੈਣ ਦਾ ਮੇਰੇ ਇਲਾਜ ਤੇ ਕੋਈ ਅਸਰ ਨਹੀ ਹੋਵੇਗਾ।

_____ _____

ਗਵਾਹ ਦੇ ਹਸਤਾਖਰ ਮਰੀਜ਼ ਦੇ ਹਸਤਾਖਰ

ਮਿਤੀ_____ ਮਿਤੀ_____

ਪਤਾ _____ ਪਤਾ _____

_____

ਨਿਰੀਖਕ ਦੇ ਹਸਤਾਖਰ

_____

ਸਿਖਿਆਰਥੀ ਦੇ ਹਸਤਾਖਰ